NOVELL®

Installation and

Maintenance

NetWare®

FOR MACINTOSH VERSION 2.2

NOVELL®

Installation and Maintenance

NetWare®

FOR MACINTOSH VERSION 2.2

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About this guide

This guide explains how to install and configure NetWare for Macintosh with NetWare v2.2.

This guide also describes how to set up a file service environment for Macintosh users, set NetWare security, create user logins, define groups, and set up an Apple print environment for Macintosh and DOS users.

This guide does not explain the full procedure for installing NetWare or configuring the many NetWare features. These are described in the NetWare v2.2 documentation.

Who should read this guide

This guide is written for the network administrator, who is responsible for setting up and maintaining NetWare LANs. In general, the network administrator is involved in planning and implementing the physical internet (for example, laying the network cables, adding and removing nodes on individual networks, placing routers and routers), as well as installing and configuring network software and services.

The network administrator should have some technical knowledge of network addressing, routing, and operation. If AppleTalk Phase 2 routers are in use on the internet, this guide assumes the network administrator has some knowledge of router configuration.

How to use this guide

This guide is primarily organized for administrators who are creating a new NetWare file server or router with Macintosh support. The chapters show the sequence you should follow for determining the requirements for NetWare for Macintosh, planning a network configuration that includes AppleTalk, and performing

the necessary tasks to install and configure the software. To complete this process, you will also need the NetWare v2.2 *Installing and Maintaining the Network* manual.

If you are not creating a new file server or router on a PC or PS/2 system but are simply upgrading an existing NetWare for Macintosh installation to include AppleTalk Phase 2, Token Ring, and AppleTalk Filing Protocol (AFP) 2.0, you should verify that both the NetWare file server (or router) and its Macintosh clients fulfill the system requirements. Then skip to "Performing maintenance, and upgrading a server from v2.15 to v2.2" on page 46.

The NetWare for Macintosh v2.2 *Installation and Maintenance* manual includes the following chapters and appendices:

- **Chapter 1**, "Getting started," describes the system requirements for a NetWare for Macintosh file server or router, Macintosh clients, and Apple printers.
- **Chapter 2**, "Sample cabling configurations," presents four sample cabling configurations.
- **Chapter 3**, "Installation on a file server," explains installation and configuration procedures. It presents step-by-step instructions for a sample installation.
- **Chapter 4**, "Installation on an external router," explains installation and configuration procedures for a NetWare external router.
- **Chapter 5**, "Installing a Macintosh client," explains how to verify the required Macintosh system software, log in to a file server and drag-copy an application to it, install the Macintosh utilities, and print to an Apple printer from a Macintosh using NetWare queues.
- **Chapter 6**, "Using the NetWare Control Center," shows you how to add users and groups, set up NetWare security, and display disk usage and folder/file information by using the NetWare Control Center (NCC) Macintosh utility.
- **Chapter 7**, "AppleTalk print services," introduces the NetWare for Macintosh console commands that are built in to the print service software, and describes how to manipulate print queues from the Macintosh by using the NetWare Desk Accessory

(NetWare DA). It also describes the print job configurations and print definitions you need to install for DOS users to print on Apple printers.

- **Chapter 8**, "Troubleshooting," explains some simple error conditions and error messages that can appear on the console while NetWare for Macintosh is running.
- **Appendix A**, "Configuration concepts," explains how NetWare for Macintosh translates AppleTalk into a format understood by NetWare (and *vice versa*), and how this influences the file service and print service configuration on a large internet.

You will find a Glossary and Index at the back of this guide.

Standards and conventions used in this guide

Italics are used to indicate emphasis; they are also used for the names of products, diskettes, and manuals.

When a word appears in `monospace` font, it means that you type that word at a command line, either on a DOS workstation or at the console. If this font is followed by a word in *italics* in a command syntax line, it means that the italicized word is a parameter that must be substituted with a real value; for example, in the command syntax line

`publish` *servername* / *queuename*

the words *servername* and *queuename* must be replaced with the name of a file server and the name of the print queue you wish to advertise on the AppleTalk network.

Chapter 1. Getting started

This chapter introduces NetWare for Macintosh and describes the software and hardware you need to install it.

This chapter also presents some basic network configurations that connect Macintosh workstations and Apple printers to a NetWare local area network.

About NetWare for Macintosh

The NetWare for Macintosh v2.2 VAPs, drivers, and installation and configuration utilities are shipped to you on one high-density diskette named MACINST.

There is also one Macintosh diskette named UTILITIES, which contains two utilities for NetWare administration from the Macintosh.

You install NetWare for Macintosh on a NetWare v2.2 file server using the standard NetWare INSTALL program used to install or upgrade a file server.

The "VAPs"

NetWare for Macintosh is a set of value-added processes (VAPs). A VAP is software that enhances the functionality of the versons 2.15 through 2.2 of the NetWare operating system.

NetWare for Macintosh includes AppleTalk transport protocol VAPs, AppleTalk Filing Protocol (AFP) 2.0 file services, and AppleTalk print services VAPs. When these processes run on a NetWare file server or router, the file server or router acts as a node on an AppleTalk network. A NetWare file server or router running these VAPs is called a VAP host.

AppleTalk transport VAPs

The AppleTalk transport VAPs are the following:

ATALK	AppleTalk Phase 1
AARP	Phase 1 Address Resolution Protocol
ATALK2	AppleTalk Phase 2
AARP2	Phase 2 Address Resolution Protocol

File services VAP

The file service VAP, AFPSPG, provides AFP 2.0 file services. The AFP file services VAP includes a software gateway, the "Service Protocol Gateway," which translates AFP requests to NetWare and vice versa. After an AFP request is translated to NetWare, the request can access a target volume on the local VAP host or on remote NetWare file servers.

A target file server is any NetWare file server that can be accessed by Macintosh users, including remote file servers that do *not* have the Macintosh VAPs loaded on them. This concept is an important one to understand when you plan a network with NetWare for Macintosh.

Print services VAPs

The print service VAPs are the following:

AQSVAP	Print service from Macintoshes
APSVAP	Print service to Apple printers

The Queue Server VAP (AQSVAP) advertises on the AppleTalk network as a LaserWriter or ImageWriter, accepts print jobs from Macintosh clients, and spools the jobs to NetWare print queues. Because the print queues can be located on remote (target) file servers, the Queue Server VAP is referred to as the "queue gateway."

The Print Server VAP (APSVAP) polls AppleTalk print queues (NetWare print queues configured for AppleTalk) and sends print jobs to the Apple printer assigned to each queue.

A number of useful console commands are built in to the print service VAPs and are automatically installed when you configure print services. These commands are described in "Managing printers and queues from the console" on page 117.

Configuration VAPs

NetWare for Macintosh v2.2 offers two VAPs that streamline the installation process, allowing you to complete the installation from the server console:

AUTOCFG	Loads the VAPs.
RCFG	Allows you to reconfigure the server to update target servers, rename the server, etc., from the server console.

At installation, these VAPs are automatically copied into the SYSTEM directory with a ".HLD" extension. AUTOCFG (also known as "the seed VAP") automatically performs system configuration, ensuring that the correct VAPs are loaded in the appropriate order. At reboot, AUTOCFG loads each VAP into the NetWare operating system, changing the extension from ".HLD" to ".V**" as it is checked before loading.

Note: Do not delete VAP files with either ".HLD" or ".V**" extensions. Doing so will interfere with the VAPs loading correctly.

After the VAPs are loaded, RCFG is invoked by typing the RECONFIG command. For more information about using RECONFIG, see "About RECONFIG" on page 37.

If you are installing a server as a router, you will use the MACSETUP program from a DOS client to perform installation and configuration. When configuring a server as a router, a special VAP is used:

RTRCFG.VAP	Configures VAPs for a router installation.

AppleTalk LAN drivers

AppleTalk Phase 1 and Phase 2 LAN drivers are provided on the *MACINST* diskette. These LAN drivers are listed in TABLE 1-1 and TABLE 1-1 on page 17.

Installation and configuration utilities

After you have installed the VAPs, the following configuration program is available from the file server console:

RECONFIG	Configures NetWare for Macintosh on a NetWare v2.2 file server.

If you are installing NetWare for Macintosh on an external router (formerly called a bridge by Novell), the following software is provided on the *MACINST* diskette:

MACINST	Installs MACSETUP on a file server.
MACSETUP	Installs and configures NetWare for Macintosh on an external router.

To run these programs, you must be logged in as supervisor to a NetWare v2.2 file server from a DOS client.

Macintosh client utilities

Two Macintosh utilities are provided on the *Macintosh Utilities* diskette: the NetWare Control Center (NCC) and the NetWare desk accessory (DA).

- **NetWare Control Center** (NCC). This is an administrative utility mostly used for managing users, groups, and data security from a Macintosh. The NCC provides a subset of SYSCON functionality, and like SYSCON, any user can invoke it. However, most of its functionality is accessible only to supervisor or supervisor equivalents.
- **NetWare DA and the Notify INIT.** The NetWare DA is a Macintosh desk accessory that uses program modules to allow users to view their security rights, modify rights in their personal folders, view print queues, and send or receive brief messages. To receive most types of messages, users must have the Notify INIT installed in their System folder.

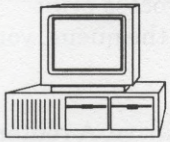
To run these programs, you must be logged in to a NetWare file server from a Macintosh client. The NCC can be launched from any convenient folder on the Macintosh. We suggest you create a folder called NETWARE UTILITIES for the NCC. Installation instructions for the NetWare DA can be found in Appendix D of theNetWare for Macintoshv2.2 *Basic Operations*.

Hardware and software requirements

A NetWare for Macintosh installation includes the following components:

- NetWare file servers or external routers
- At least one DOS client
- Macintosh clients
- Apple printers (optional)

NetWare for Macintosh host file servers or routers



You can install NetWare for Macintosh on any of the following computers:

- IBM PC AT or compatible (this must be a Novell-certified compatible)
- Compaq 386/486 or compatible
- IBM PS/2 model 50, 60, 70, or 80

which must be running the following system software:

- NetWare v2.2
- LAN driver(s) that support AppleTalk Phase 1 or Phase 2

Memory requirements for the host file server or router

For optimal performance, we recommend that you install a minimum of 4 Mbytes of RAM in the NetWare for Macintosh host file server or router. Beyond this, you should count on adding 256K of RAM for each LAN card you add beyond the initial one, and 1 Mbyte of RAM for every 100 Mbytes of hard disk storage.

Note: Real-mode routers, which support 640K base memory only, cannot run the NetWare for Macintosh software. Only protected-mode routers, which support extended memory, can be configured as VAP hosts.

Disk storage guidelines

Each NetWare for Macintosh file server requires at least one 40 Mbyte hard disk configured with at least one volume, and it can support up to 32 hard disks with 32 volumes.

You need at least 500 Kbytes of disk space to install the Macintosh VAPs, and approximately 1 Mbyte of disk space to process print queues. Depending on the size and number of files in the queue, you might need more disk space to process a print queue.

A NetWare external router does not have a network drive. A router can have a hard disk, but it must be formatted under DOS.

Concurrent logins

NetWare v2.2 limits the number of user logins. The total number of DOS and Macintosh logins is determined by the user version of NetWare that you have purchased. The connections are assigned on a "first-come first-served" basis to all Macintosh or DOS users that can access the VAP host. Connections can be all DOS, all Macintosh, or a combination of these.

LAN cards in the host file server or router

AppleTalk Phase 1 is supported on Ethernet, LocalTalk, and ARCnet. AppleTalk Phase 2 is supported on Token Ring and Ethernet. Each server or router can support up to four AppleTalk interfaces (LAN A through D).

TABLE 1-1 PC LAN cards supporting AppleTalk Phase 1 (certified)

Topology	Network card	File server type	LAN Drivers
Ethernet	Novell NE2000	AT-compatible	With AppleTalk
	Novell NE/2	Micro Channel	With AppleTalk
	3Com 3C505	AT-compatible	With AppleTalk
	3Com 3C523	Micro Channel	With AppleTalk
ARCnet	Novell RX-NET	AT-compatible	With AppleTalk
LocalTalk	Dayna DL2000	AT-compatible	With AppleTalk
	Novell NL1000	AT-compatible	With AppleTalk
	Dayna DL/2	Micro Channel	With AppleTalk

TABLE 1-2 PC LAN cards supporting AppleTalk Phase 2 (certified)

Topology	Network card	File server type	LAN Drivers
Ethernet	Novell NE2000	AT-compatible	With AppleTalk 2
	Novell NE/2	Micro Channel	With AppleTalk 2
	3Com 3C505	AT-compatible	With AppleTalk 2
	3Com 3C523	Micro Channel	With AppleTalk 2
Token Ring	IBM Token-Ring 16/4 Adapter	AT-compatible	With AppleTalk 2
	IBM Token-Ring 16/4 Adapter/A	Micro Channel	With AppleTalk 2
	IBM token ring network II	AT-compatible (4Mb)	With AppleTalk 2
	IBM token ring network II/A	Micro Channel (4Mb)	With AppleTalk 2

DOS client requirements

To install and configure the Macintosh VAPs, you need to log in to a NetWare v2.2 file server as supervisor from a DOS client. If you do not already have a DOS client configured, please refer to the NetWare v2.2 *Installing and Maintaining the Network* manual for DOS client requirements and configuration.

Macintosh client requirements

Any of the following Apple Macintosh computers can be used as NetWare clients:

- Macintosh II family of computers
- Macintosh SE/30
- Macintosh SE
- Macintosh Plus
- Macintosh 512E

Macintosh clients must be running the following system software:

- *AppleShare Workstation* Version 2.0 or above
- *System* Version 6.0 or above
- *Finder* Version 6.1 or above
- *Chooser* Version 3.3 or above

To access network LaserWriter or ImageWriter printers, Macintosh clients must be running the following printer software:

- *LaserWriter* Version 5.2 or above
- *ImageWriter* Version 2.7 or above

Note: The ImageWriter driver software must be the AppleTalk version, even if the ImageWriter is connected directly to the serial or parallel port of the NetWare file server or router.

Memory requirements for Macintosh clients

No additional memory is required in Macintosh clients. Note that the Macintosh 512K is not supported because of its limited amount of RAM and its lack of support for Apple's Hierarchical File System in ROM.

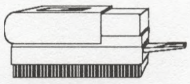
LAN cards for Macintosh clients

There are no special NetWare requirements for Macintosh LAN cards on Ethernet, Token Ring, and ARCnet; you can use any card that supports either AppleTalk Phase 1 or Phase 2. Of course, the Macintosh built-in LocalTalk connection can also be used to connect to a LocalTalk network in a NetWare file server or router.

For detailed instructions on connecting a Macintosh to a network, please refer to the documentation that accompanies the LAN hardware.

Note: If the Macintosh is connected to Ethernet by an Ethernet controller card, you should verify that the EtherTalk driver is Version 1.2 or above. To do this, open the System Folder, select "EtherTalk" and choose Get Info from the File menu.

Apple LaserWriter and ImageWriter printers



Any of the following types of Apple printer can be assigned to service AppleTalk print queues on a NetWare file server:

- LaserWriter
- LaserWriter Plus
- LaserWriter NT or NTX
- ImageWriter II
- ImageWriter LQ

Server/printer connections

PostScript printers such as Apple LaserWriters must be connected to a LocalTalk network as a node. The LocalTalk network must be accessible via AppleTalk to the NetWare file server or router processing the queue. Please see "Sample cabling configurations" on page 21 for examples of how to connect printers to file servers or routers.

ImageWriter II or ImageWriter LQ printers can be connected to a LocalTalk network as a node or connected directly to the serial or parallel port of the NetWare file server or router. (Note that in this case, the Macintosh client must still be running the AppleTalk version of the ImageWriter driver.)

For detailed instructions on connecting Apple printers to LocalTalk or to a serial or parallel printer port, please refer to the *Owner's Guide* for the LaserWriter or ImageWriter.

AppleTalk print queues

Each host file server or router running the print service VAPs can handle up to five printers and eight AppleTalk print queues. All of the printers assigned to an AppleTalk print queue must be of the same type.

We recommend that you assign only one printer to an AppleTalk print queue whenever possible. If you do not maintain a one-to-one mapping of printers to queues, make sure all printers attached to a queue are of the same type and support exactly the same set of fonts.

Chapter 2. Sample cabling configurations

This chapter provides four sample cabling configurations you can use to create an AppleTalk network that includes a NetWare file server or router:

- Adding Macintoshes to an existing LAN on page 22
- Creating a separate LocalTalk LAN on page 24
- A LocalTalk LAN connected to an AppleTalk router on page 26
- A NetWare for Macintosh router on page 28.

Following each example is a list of configuration steps to follow. Use these steps as a a guide; more detailed instructions can be found in later chapters of this manual.

Planning your network configuration

It is important to recognize that NetWare for Macintosh *does not* perform any internal AppleTalk routing. If you configure more than one LAN for AppleTalk in a single file server or router, the AppleTalk devices on the separate LANs will not "see" each other through the NetWare file server or router.

However, all Macintosh workstations on the separate LANs will be able to "see" the file server and, depending on how you configure file and print services, will be able to see other NetWare file servers on each other's LANs.

Note: The terms "LAN A" and "LAN B" in this chapter are used only as examples. There is no requirement that AppleTalk support in a file server or router must be on LAN A. A file server or router has slots for four LAN cards (LAN A through D). When you install AppleTalk drivers and configure NetWare for Macintosh, the file server or router becomes a node on an AppleTalk network. This AppleTalk network can be on LAN A through D.

Example 1: Adding Macintoshes to an existing LAN

This example shows how to add Macintosh workstations to an existing NetWare LAN (LAN A) and use a separate LocalTalk cable (LAN B) to support an Apple printer. NetWare for Macintosh will be installed on SERVER_A. This is shown in FIGURE 2-1.

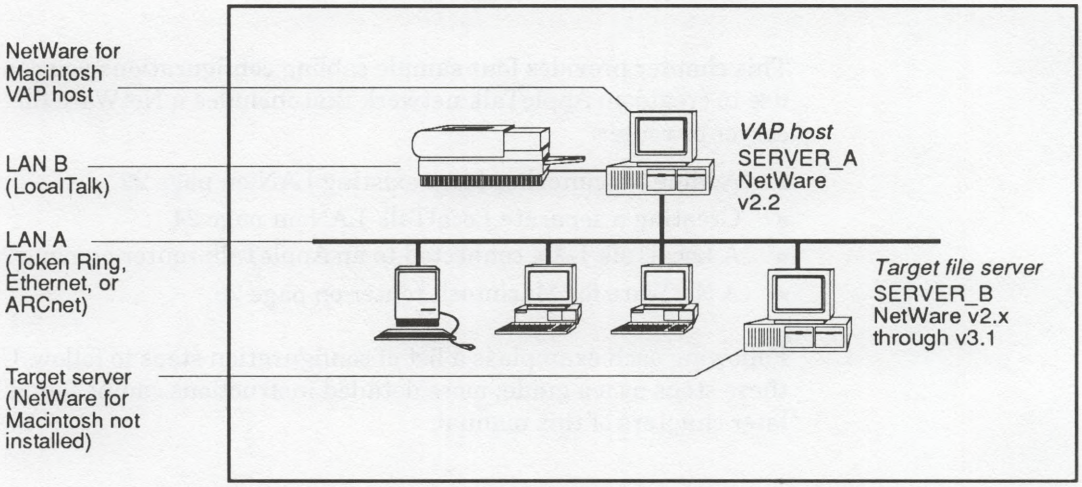


FIGURE 2-1 Adding Macintosh workstations to a NetWare LAN

AppleTalk

In this configuration, SERVER_A supports AppleTalk on its LAN A interface, and Macintosh workstations are connected to LAN A. If there are other AppleTalk services (for example, AppleShare servers or network modems) on LAN A or beyond LAN A on an AppleTalk internet, Macintosh users on LAN A will be able to access those services.

File services

NetWare for Macintosh on SERVER_A can be configured to allow Macintosh access to both SERVER_A and SERVER_B, even though SERVER_B does not support AppleTalk on its LAN A interface. This is done by specifying SERVER_B as a "target file server" in RECONFIG.

Print services

Because the LaserWriter in this example is on a separate LocalTalk LAN, both Macintosh users and DOS users will only be able to access the LaserWriter through an AppleTalk print queue.

Configuration tasks

Installation and configuration on SERVER_A involves the following tasks:

1. **Install a PC LocalTalk card in SERVER_A and use INSTALL to configure LAN B.**
2. **Use INSTALL to configure an AppleTalk LAN driver on SERVER_A's LAN A interface and to install NetWare for Macintosh. Reboot the server twice to load the Macintosh VAPs.**
3. **Use RECONFIG to add SERVER_B as a target file server.**
4. **Reboot the server and use the console commands to configure AppleTalk print queues.**
5. **Connect the Macintosh computers and LaserWriter.**

   For instructions on connecting a Macintosh and LaserWriter, please refer to the documentation that accompanies that hardware.

Example 2: Creating a separate LocalTalk LAN

This example shows how to use a separate LocalTalk cable (LAN B) to add Macintosh workstations and an Apple printer. NetWare for Macintosh will be installed on SERVER_A. This configuration is shown in FIGURE 2-2:

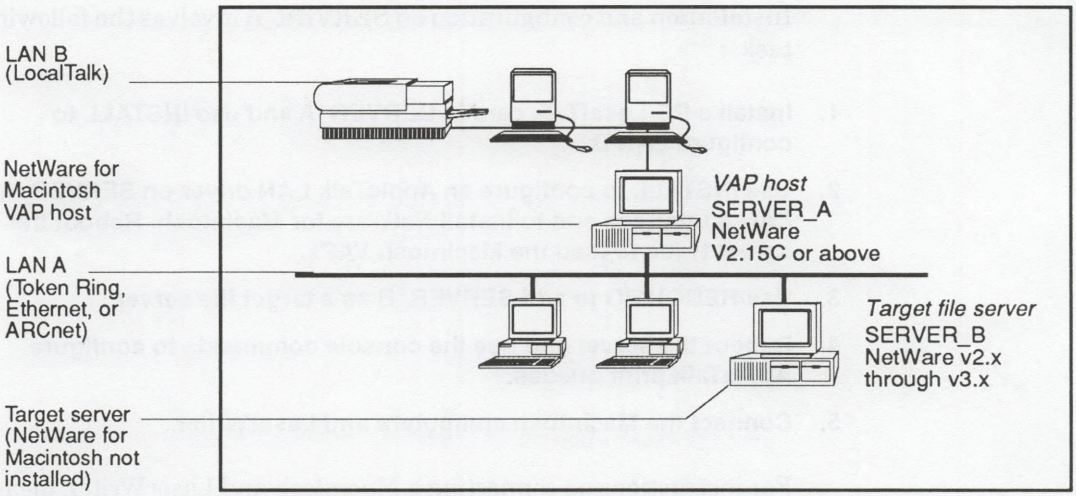


FIGURE 2-2 LocalTalk network for Macintosh clients and Apple printers

AppleTalk

In this configuration, SERVER_A supports AppleTalk on its LAN B interface, and Macintosh workstations are connected to LAN B. LAN A supports only NetWare file servers and DOS clients. The Macintosh workstations on LAN B will not be able to communicate with other AppleTalk devices connected to LAN A or beyond LAN A on an AppleTalk internet.

File services

As in the preceding example, SERVER_B can be configured as target file server so Macintosh users can access files on both servers, even though SERVER_B is not running the NetWare for Macintosh software. (As the VAP host, SERVER_A is automatically placed on the list of target file servers at installation.)

Print services

Because the LaserWriter is on the same LocalTalk LAN as the Macintosh workstations, Macintosh users will see both the NetWare print queue and the LaserWriter itself in the Chooser.

Configuration tasks

Installation and configuration on SERVER_A involves the following tasks:

1. **Install a PC LocalTalk card in SERVER_A and use INSTALL to configure LAN B and to install NetWare for Macintosh. Reboot the server twice to load the Macintosh VAPs.**
2. **Use RECONFIG to add SERVER_B to the target file server list.**
3. **Reboot the server and use the console commands to configure AppleTalk print queues.**
4. **Connect the Macintosh computers and LaserWriter.**

   For instructions on connecting a Macintosh and LaserWriter, please refer to the documentation that accompanies that hardware.

Example 3: A LocalTalk LAN connected to an AppleTalk router

This example shows how to create two AppleTalk LANs that can communicate through a third-party AppleTalk router such as Apple Computer's *Internet Router* software. Both AppleTalk LANs can support Macintosh workstations. NetWare for Macintosh will be installed on SERVER_A. This is shown in FIGURE 2-3:

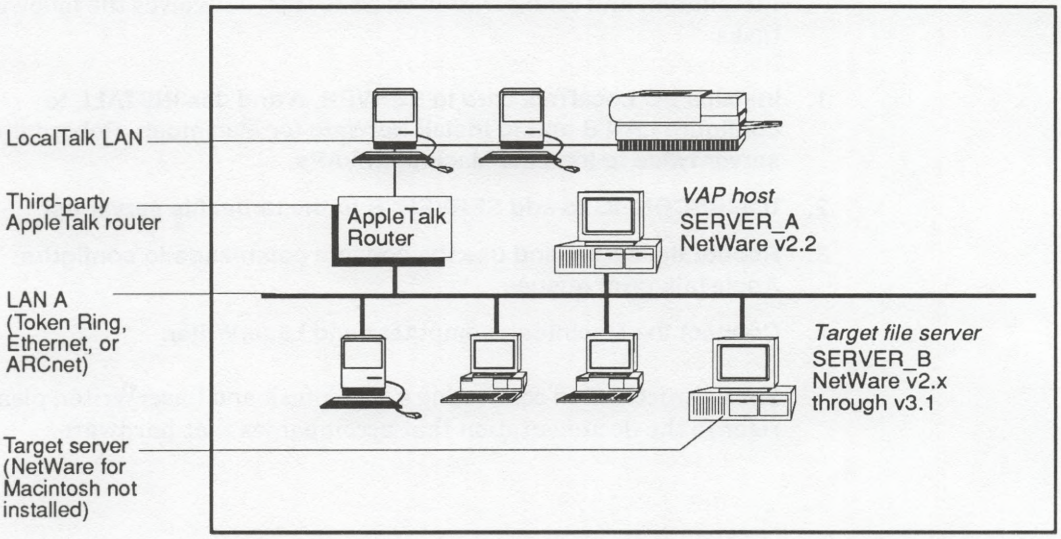


FIGURE 2-3 Adding Mac workstations by using an AppleTalk router

AppleTalk

In this configuration, SERVER_A supports AppleTalk on its LAN A interface, and Macintosh workstations are connected to LAN A. Additional Macintosh workstations are added to a LocalTalk LAN connected to LAN A through the AppleTalk router. If there are other AppleTalk services (for example, AppleShare servers or network modems) on LAN A or beyond LAN A on an AppleTalk internet, Macintosh users on LAN A and on the LocalTalk LAN will be able to access those services.

File services

As in the preceding examples, SERVER_B can be configured as target file servers so Macintosh users can access files on both servers, even though SERVER_B is not running the NetWare for Macintosh software. (SERVER_A is automatically placed on the target server list.)

Print services

Because AppleTalk routers know how to handle AppleTalk service lookups, all Macintosh clients in this example (including the Macintosh on LAN A) will see both the NetWare print queue and the LaserWriter in the Chooser. If the printer is in a different zone than SERVER_A, the queue will appear in SERVER_A's zone and the LaserWriter in its own zone in the Chooser. The DOS clients on LAN A will see only the NetWare print queue.

Configuration tasks

Installation and configuration on SERVER_A involves the following tasks:

1. **Install and configure the AppleTalk router.**
2. **Use INSTALL to install an AppleTalk LAN driver on SERVER_A's LAN A interface and to install NetWare for Macintosh on SERVER_A. Reboot the server twice to load the Macintosh VAPs.**
3. **Use RECONFIG to add SERVER_B to the list of target file servers.**
4. **Reboot the server and use the console commands to configure AppleTalk print queues.**
5. **Connect the Macintosh computers and LaserWriter.**

For instructions on configuring an AppleTalk router and on connecting a Macintosh and LaserWriter, please refer to the documentation that accompanies that hardware.

Example 4: A NetWare for Macintosh router

This example shows how to use a NetWare external router to run NetWare for Macintosh. This is shown in FIGURE 2-4.

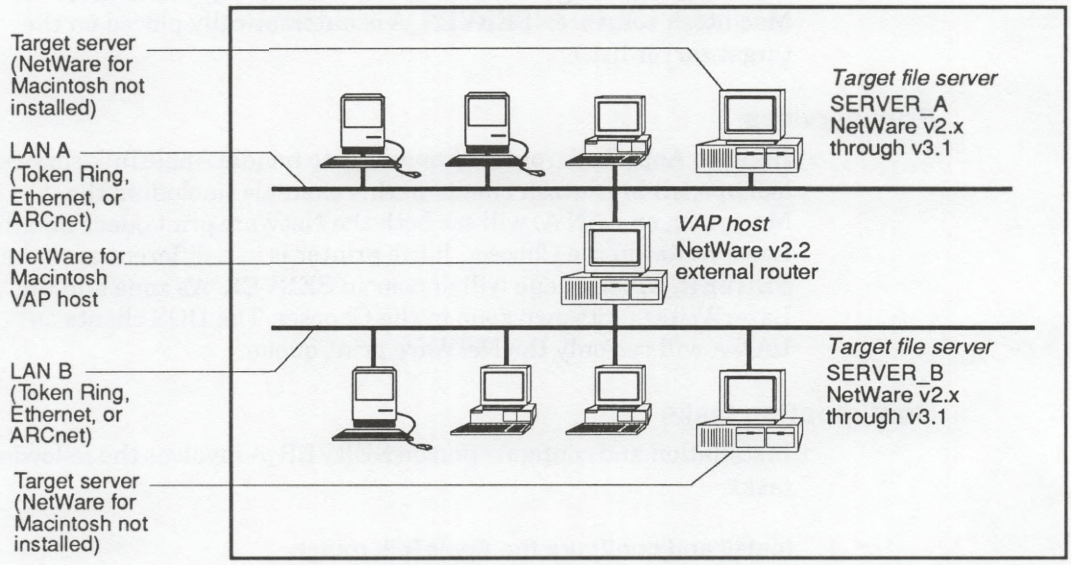


FIGURE 2-4 An external router configuration

This configuration off-loads the system overhead of running the VAPs and frees up file servers, which are configured as "target file servers" on the router, for quicker disk access. This can result in noticeably improved server performance on a busy network. It also allows Macintosh workstations on both LAN A and LAN B to access NetWare services on their own and on each other's LANs.

AppleTalk

In this configuration, the external router supports AppleTalk on both its LAN A and LAN B interfaces, and Macintosh workstations are connected to both LANs. Because there is no internal AppleTalk routing in NetWare for Macintosh, AppleTalk services (such as AppleShare servers or network modems) will not be visible to Macintoshes across the NetWare router.

File services

You can configure the router to support both SERVER_A and SERVER_B as target file servers, allowing Macintosh users on both LAN A and LAN B to access both file servers. Note that SERVER_A and SERVER_B can be running either NetWare v2.2 or else NetWare v3.0 or above.

Print services

You can configure the router to support print queues on SERVER_B, allowing Macintosh users on both LAN A and LAN B to print to the Apple LaserWriter.

Configuration tasks

Installation and configuration on the external router involves the following tasks:

1. **Use ROUTEGEN to configure an AppleTalk LAN driver in the router on LAN A and on LAN B.**
2. **Use MACSETUP to install and configure the Macintosh VAPs on the ROUTER.EXE disk.**
3. **Use RECONFIG to add SERVER_A and SERVER_B to the list of target file servers.**
4. **Connect the Macintosh computers and LaserWriter.**

See Chapter 4, "Installation on an External Router," for references to NetWare's ROUTEGEN program and a description of MACSETUP. For instructions on connecting a Macintosh and LaserWriter, please refer to the documentation that accompanies that hardware.

Chapter 3. Installation on a file server

This chapter explains how to install and configure NetWare for Macintosh on a NetWare v2.2 file server. It also tells how to upgrade NetWare for Macintosh from v2.15 to v2.2.

Installation and configuration overview

FIGURE 3-1 shows the steps you need to follow to install and configure the Macintosh VAPs on a NetWare v2.2 file server.

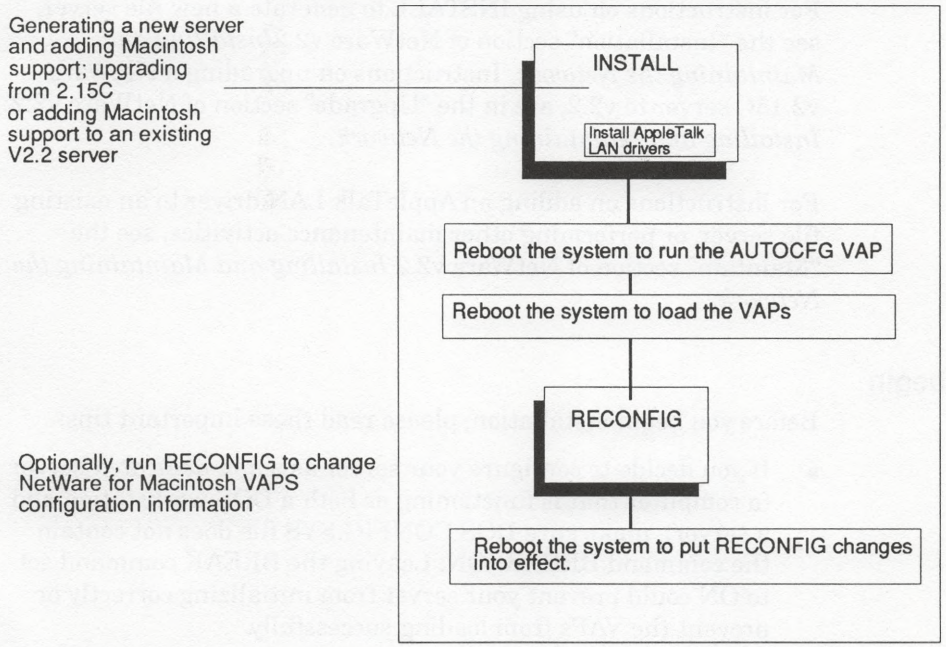

Generating a new server and adding Macintosh support; upgrading from 2.15C or adding Macintosh support to an existing V2.2 server
INSTALL
Install AppleTalk LAN drivers
Reboot the system to run the AUTOCFG VAP
Reboot the system to load the VAPs
RECONFIG
Optionally, run RECONFIG to change NetWare for Macintosh VAPS configuration information
Reboot the system to put RECONFIG changes into effect.

FIGURE 3-1 Installing on NetWare v2.2 File Servers

NetWare v2.2 uses the INSTALL to do the following:

- **Install and configure** the file server operating system, option cards, drivers, and the AUTOCFG VAP. The AUTOCFG VAP checks which AppleTalk LAN drivers you have installed and loads the appropriate version of the AppleTalk VAP.
- **Upgrade** a NetWare v2.15 file server and the VAPs without changing the files and configuration on the file server.
- **Perform maintenance tasks** on a file server. Such tasks include adding or removing network boards or external hard disks.

NetWare v2.2 uses the RECONFIG program to change the configuration of the NetWare for Macintosh VAPs on the server. RECONFIG is run the from the server console.

Where to find installation, upgrade, and maintenance instructions

For instructions on using INSTALL to generate a new file server, see the "Installation" section of NetWare v2.2*Installing and Maintaining the Network.* Instructions on upgrading a NetWare v2.15C server to v2.2, are in the "Upgrade" section of NetWare v2.2 *Installing and Maintaining the Network.*

For instructions on adding an AppleTalk LAN driver to an existing file server, or performing other maintenance activities, see the "Maintain" section of NetWare v2.2 *Installing and Maintaining the Network.*

Before you begin

Before you begin installation, please read these important tips:

- If you decide to configure your server as a *non-dedicated* server (a computer that is functioning as both a DOS workstation and a server), make sure DOS CONFIG.SYS file does not contain the command BREAK=ON. Leaving the BREAK command set to ON could prevent your server from initializing correctly or prevent the VAPs from loading successfully.
- If you are running a *dedicated* server, we suggest you delete any AUTOEXEC.BAT or CONFIG.SYS files that might be on the computer. If you do not wish to delete those files, you should check it to make sure that they are not automatically loading

programs that will take up the computer's memory and thus cause memory problems when you run the server or try to load the VAPs.

When to use AppleTalk Phase 2

AppleTalk Phase 2 extends the basic AppleTalk protocol suite for high-speed media such as Token Ring and Ethernet, which can support a large number of devices. LocalTalk and ARCnet LANs are not high-speed media, so the distinction between AppleTalk Phase 1 and Phase 2 does not apply to these types of cable.

- ARCnet and LocalTalk support only Phase 1 drivers.
- Token Ring supports only Phase 2 drivers.
- Ethernet can support either Phase 2 or Phase 1.

If you are configuring AppleTalk Phase 2 on Ethernet, make sure all Phase 2 routers on the cable comply with Phase 2. If the network is being upgraded from AppleTalk Phase 1 to Phase 2, AppleTalk routers might be configured to support routing between these two versions of AppleTalk (for example, using Apple Computer's *Upgrade Utility*), but this is usually a temporary situation until all devices have been upgraded to support Phase 2.

How the VAPs are loaded

During INSTALL, if you indicate that you want to load the Macintosh VAPs, the file AUTOCFG.VAP will be flagged so that it can be copied into the host's SYS:SYSTEM directory, along with the rest of the VAP files, which have a file extension of ".HLD."

At the first reboot after you've run INSTALL, if you've indicated that you want to load the Macintosh VAPs, the AUTOCFG VAP is loaded into the NetWare operating system's memory. (At this point, AUTOCFG is the only file with a ".V**" file extension and format, the only format the NetWare operating system recognizes to load into its memory.)

AUTOCFG reads the file NET$OS.EXE, which contains the information you entered during installation (such as type of LAN card or its configuration), and determines which VAPs to load (in particular, whether to load AppleTalk Phase 1 or Phase 2 transport VAPs). The AUTOCFG VAP renames the VAPs to be loaded from their.HLD extension to the extension .V**.

When you reboot a second time, all VAPs with an extension of.V** will be loaded into memory. From then on, unless you change the installation configuration, when you power-up the server, you will be asked if you want to load the VAPs, and if you answer "yes," they will be loaded.

How to automate loading the VAPs

If you wish the Macintosh VAPs to load automatically at system boot time without displaying the prompt

```
Value Added Processes have been defined.

Do you wish to load them?
```

you can log in to the file server as supervisor and use a text editor to modify the file server's SERVER.CFG file. After opening the file in a text editor, add the line

```
VAP WAIT=0
```

This will cause the VAPs to load automatically without waiting. If you wish to increase the time it takes the VAPs to load, you can change the zero to any number of seconds. The VAP load can be aborted during this wait time.

Verifying that the VAPs were correctly installed

After you have supplied the configuration data required for your network, rebooted the server to load the AUTOCFG VAP, and rebooted again to load the VAPs, use the VAP console command to verify that the proper VAPs have been installed. At the file server console, type

```
VAP
```

and press <Enter>. This prints out the VAPs (including their version numbers) and Macintosh console commands running on the server. For example, if you have installed AppleTalk Phase 2, file services, and print services, then the VAP command lists the VAPs and the commands they support. For example:

```
Dayna AppleTalk 2 Address Resolution Protocol
(AARP) v2.2
Dayna AppleTalk 2 VAP (ATALK2) V2.2

Novell AppleTalk Filing Protocol Gateway (AFPSPG) V2.2

Dayna AppleTalk Queue Gateway (AQSVAP) V2.2
    TYPE
    QLIST
    PUBLISH
    UNPUBLISH
Dayna AppleTalk Print Server (APSVAP) V2.2
    ATTACH
    DETACH
    START
    STOP
    KILL
    PLIST
    QUERY

NetWare Auto Configuration VAP (RCFG) - V2.2

    RECONFIG
    CREATE
    DELETE
    SHOW
```

These commands are used to administer print queues from the console and are described in "Managing printers and queues from the console" on page 117.

Configuring NetWare for Macintosh on a file server

RECONFIG is used to change NetWare for Macintosh configuration information. You can use RECONFIG whenever you do the following:

- Remove or add volumes or LAN cards.
- Update the target server list
- Select a new default zone name for the server.

To invoke RECONFIG from the console of a server running the NetWare for Macintosh VAPs, type

```
RECONFIG
```

and press <Enter>. This invokes the RECONFIG VAP (RCFG), which allows you to enter configuration data. After supplying the file service configuration information, you need to reboot the file server. You can configure print services on the same file server before or after you reboot; this is described in Chapter 5, "AppleTalk Print Services."

About RECONFIG

RECONFIG allows you to enter configuration information from the server console. Specifically, RECONFIG allows you to do the following:

- Inform NetWare for Mainctosh that you are going to add or remove volumes or LAN adapters, and that a new Macintosh autoconfiguration should take place.
- Update the AppleTalk target server list (add, change, or delete target servers).
- Select a new default AppleTalk Phase 2 zone for the server.

The illustration on the following page shows the sequence of RECONFIG tasks.

When you have completed a task through RECONFIG, you will be returned to the NetWare prompt. If you wish to perform other configuration tasks, simply invoke the program again by typing

```
RECONFIG
```

(followed by <Enter>) and then answering "no" to each task until you reach the one you want.

Entering your user name and password

The first things RECONFIG prompts you for are your user name and password. You must log in as Supervisor, or have supervisor equivalency in order to use RECONFIG.

Adding or removing volumes or LAN adapters

RECONFIG asks if you want to add or move volumes or LAN adapters. If you intend to add or remove volumes or LAN adapters run RECONFIG and answer "yes" to this prompt. A "yes" answer returns the server to an "autoconfig" state so that it can be configured with the new hardware you have installed. Then, you will exit from RECONFIG and be prompted to follow these steps:

RECONFIG Task Overview

1. Enter user name for host server SERVERNAME

Enter password for the host server SERVERNAME

2. Do you intend to add or remove volumes or LAN adapters (Y or N)?

(Selecting "yes" exits you to the NetWare prompt so that you can add or remove hardware. Selecting "no" brings you to the next question.)

3. Do you want to update the AppleTalk target server list (Y or N) ?

If you answer "Yes," you will be asked if you want to add, change or delete target servers.

If you are adding or changing target servers, you will be given the opportunity to enter an alias name for the target server.

4. Do you want to change AppleTalk Phase 2 zone names (Y or N)?

1. **Down the server.**

   After you have completely powered-down your server, you can follow the manufacturer's instructions for adding a LAN card or new hard disk.

2. **Run INSTALL to make changes.**

   For example, if you have added a LAN card, you will need to add hardware configuration information for that new card. This information is entered in the INSTALL program's "Operating System Generation" screen. Please see "Where to find installation, upgrade, and maintenance instructions" on page 32 for more information.

3. **Reboot the server to run the AUTOCFG VAP.**

   When you are asked if you want to load the VAPs, type "y."

4. **Reboot the server again so that the VAPs can be installed.**

   When you are asked if you want to load the VAPs, type "y."

Updating the Appletalk target server list

If you want to update the AppleTalk target server list, answer no to RECONFIG's questions until you are prompted "Do you want to update the AppleTalk target server list?" Answering "yes" allows you to add, change, or delete target servers.

You can enter the names of up to eight target file servers. You *do not* enter the server you are configuring as a target server. This is done automatically. However, the name of the server you are configuring can be deleted and then re-entered)

Note: During installation, the server you are configuring is automatically placed on the target server list. If you rename your server, you will need to update the target server list using RECONFIG to reflect the change.

Depending on the AppleTalk network configuration, you might also need to enter:

- An AppleTalk alias for one or more target file servers. If you assign an alias, it will appear in the Macintosh Chooser instead of the file server's NetWare name. An alias is usually not required unless you have installed the Macintosh VAPs on more than one file server and the servers will be targetting one another. Please see "Solution: use aliases" on page 166 for details.

Selecting a new default zone

RECONFIG allows you to select a new default AppleTalk Phase 2 zone for the server.

After you invoke RECONFIG, press <Enter> until you see the question "Do you want to change AppleTalk Phase 2 zone names (Y or N)?" If you select "yes," you can then enter a new zone name. (This name should be in the list of Phase 2 zone names configured in the network's router. Of course, if there is no network router, there will be only one zone on the network.)

An example installation and configuration

This example shows how to generate a NetWare v2.2 file server and install the Macintosh VAPs. Please see the "Installation" section of NetWare v2.2 *Installing and Maintaining the Network* for full information about using the INSTALL program.

The network topology we have provided is a simplified one that shows a NetWare server running file and print services, and a

target server. In this example, NetWare for Macintosh is installed on SERVER_A, and SERVER_B is configured as a target file server.

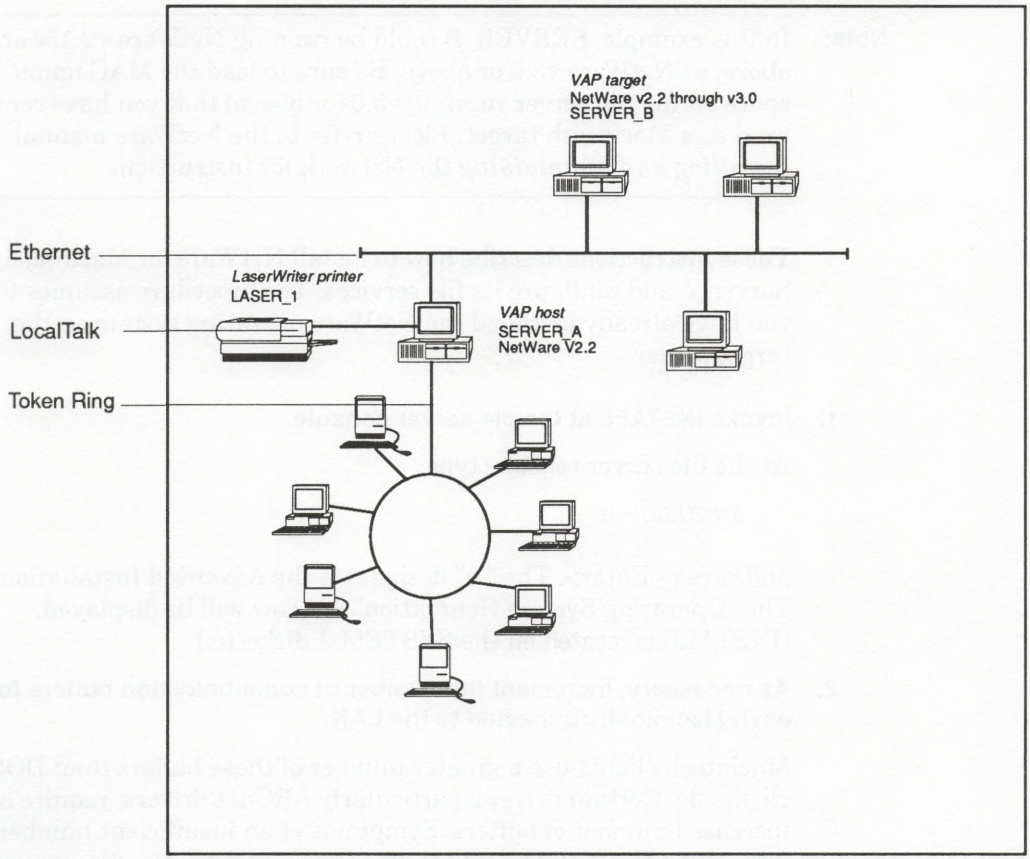


FIGURE 3-2 Example installation on a NetWare v2.2 file server

The two servers are connected to an Ethernet backbone, Server A and Server B. Server A has three interface cards:

- A Token Ring interface. There are three Macintosh clients installed on the Token Ring LAN (as well as three DOS clients).
- An Ethernet interface to the Ethernet backbone.
- A LocalTalk interface to support a LaserWriter.

Server B is a target server and is not a VAP host.

Note: In this example, SERVER_B could be running NetWare v2.15c or above, or NetWare v3.0 or above. Be sure to load the MAC name space on the file server running v3.0 (or above) that you have configured as a Macintosh target. Please refer to the NetWare manual *Installing and Maintaining* the Network for instructions.

These instructions describe how to install NetWare for Macintosh on Server_A and configure its file services. The procedure assumes that you have already installed the NetWare operating system on the target server.

1. **Invoke INSTALL at the file server console.**

   At the file server console, type

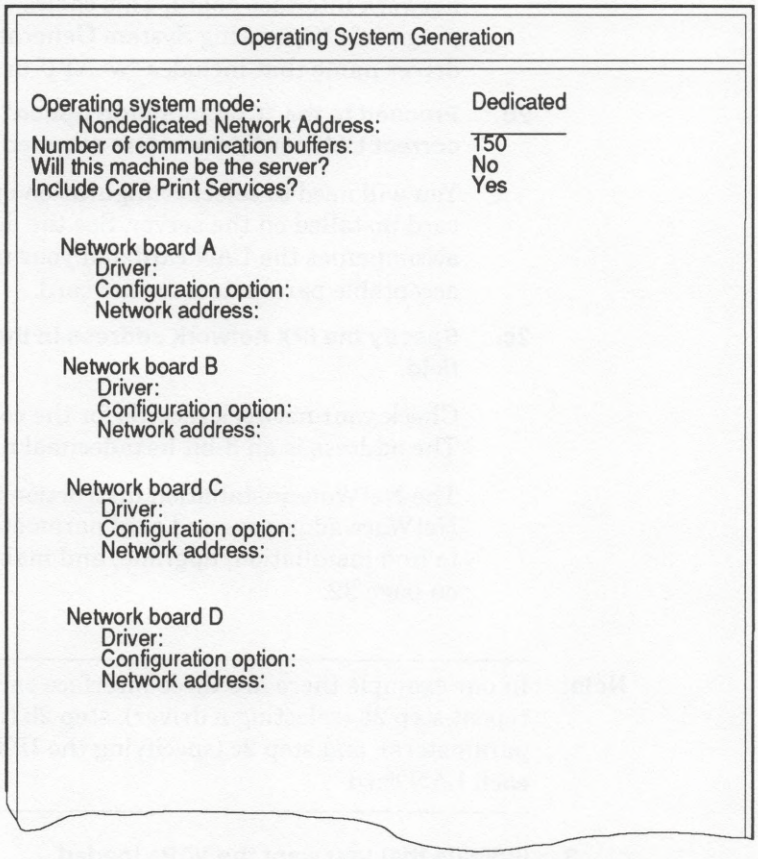
   ```
   INSTALL -e
   ```

   and press <Enter>. The "-e" designates the Advanced Installation. The "Operating System Generation" window will be displayed. (INSTALL is located on the SYSTEM-1 diskette.)

2. **As necessary, increment the number of communication buffers for each Macintosh connected to the LAN.**

   Macintosh clients use a greater number of these buffers than DOS clients do. Certain drivers, particularly ARCnet drivers, require an increased number of buffers. Symptoms of an insufficient number of communication buffers include routing errors from the file server, or the server dropping packets. If you see any of these symptoms, try increasing the number of communication buffers.

   The NetWare installation instructions provide details on increasing communication buffers. This information is entered in the INSTALL program's "Operating System Generation" window. Please see "Where to find installation, upgrade, and maintenance instructions" on page 32.



In our example, which is a very small network with three Macintosh clients on a Token Ring LAN, the default number of 150 buffers is sufficient. On a server that will be heavily loaded, we suggest that you increment the number of communication buffers to 250 to prevent degrading the server's performance. (For the same reason, we suggest you increase the number of open files to 1000 for a server that you expect to be heavily used. This is done in INSTALL's "File Server Definition" screen.)

2a. Make sure that you select the correct AppleTalk driver for your network board(s).

You must select the correct AppleTalk LAN driver for your network interface board. This choice is made in the INSTALL program's "Operating System Generation" window. Choose a driver name that includes "w/ AT1" or "w/ AT2."

2b. Proceed to the "Configuration option" menu and select the correct LAN card parameters required by the card.

You will need to select configuration options for each LAN card installed on the server. See the documentation that accompanies the LAN card and your network records for acceptable parameters for the card.

2c. Specify the IPX network address in the "Network address" field.

Check your network records for the correct network address. The address is an 8-bit hexadecimal number.

The NetWare installation instructions provide details on NetWare addresses and card parameters. Please see "Where to find installation, upgrade, and maintenance instructions" on page 32.

Note: In our example there are three interface cards, so you will have to repeat step 2a (selecting a driver), step 2b (choosing LAN card parameters), and step 2c (specifying the IPX network address) for each LAN card.

---

3. Indicate that you want the VAPs loaded.

Press <Esc> as necessary to find the "File Server Definition" window and view the prompt:

```
Install Macintosh VAPs
```

Type "y" and press <Enter>. Continue with the rest of the INSTALL program to complete installation.

4. **Reboot the server to run the AUTOCFG.VAP.**

   You will need to reboot the server so that the AUTOCFG VAP can be loaded into the NetWare operating system. After you reboot, you will see the message:

   ```
   Value Added Processes have been defined. Do you wish
   to load them?
   ```

   Type "y" and press <Enter>. You will see a message that tells you the AUTOCFG.VAP is loading. Then you will see this message:

   ```
   NETWARE AppleTalk VAP configuration in progress

   One moment please.
   ```

   You will then wait until you see this message before you down the server and reboot:

   ```
   NetWare AppleTalk VAPs have been installed
   successfully.

   Type down and reboot the file server.
   ```

5. **Reboot the server again to load the VAPs and check that the installation is correct.**

   The VAPs are loaded into NetWare when the VAP host (a file server) reboots. (See "Configuration VAPs" on page 13 for a description of AUTOCFG, the VAP that automatically loads all of the Macintosh VAPs, including itself.) You will see the following message on the system console:

   ```
   Value Added Process have been defined. Do you
   wish to load them?
   ```

   Type "y" and press <Enter>. This is followed by several messages indicating that the VAPs are being installed, followed by the NetWare colon (:) prompt.

6. **Configure file services for your site.**

   You will use RECONFIG to configure AppleTalk file services. Type

   ```
   RECONFIG <Enter>
   ```

and press <Enter>. Answer "no" to RECONFIG's questions until you see the prompt "Do you want to update the AppleTalk target server list?" Answer "yes" and then select "A" to add a target server.

In our example, the target server is SERVER_B, so you would type SERVER_B as the target server name. Since there will be no naming conflicts in this simple example, you do not need to give the target server an alias name.

7. **Configure print services for you site.**

   You will need to create a print queue, attach it to a printer, and publish it. You will use the following commands from the SERVER_A console. In our example, the printer is called LASER_1; the queue name will be NEWQUEUE:

   ```
   CREATE NEWQUEUE AS TYPE LASERWRITER <Enter>
   ```

   The `CREATE` command must be used together with the `PUBLISH` and `ATTACH` commands to create a functioning print queue:

   ```
   ATTACH LASER_1 TO NEWQUEUE <Enter>
   ```

   The `PUBLISH` command causes a queue to advertise as a service (an ImageWriter or LaserWriter) on the AppleTalk network:

   ```
   PUBLISH NEWQUEUE <Enter>
   ```

   For more information about configuring print services, see "Managing printers and queues from the console" on page 117.

Performing maintenance, and upgrading a server from v2.15 to v2.2

Instructions for upgrading a NetWare server from 2.15 to v2.2 are found in the "Upgrading" section of NetWare v2.2 *Installing and Maintaining the Network.*

Instructions for performing maintenance on a server can be found in the "Maintenance" section of NetWare v2.2 *Installing and Maintaining the Network.*

If you are upgrading, you will need to install the v2.2 VAPs. You will follow the same steps outlined in FIGURE 3-1 on page 31.

If you are performing maintenance on the file server that will change the LAN card/driver configuration or add additional volumes, then you must run RECONFIG to make NetWare for Macintosh aware of these changes. Before downing the server, type RECONFIG at the console and answer "yes" to the question "Do you intend to add or remove volumes or LAN adapters?" This notifies NetWare for Macintosh that it needs to re-autoconfigure itself after the newly configured server is brought up. After the AUTOCFG VAP is loaded, you will need to down the server again and reboot it to load the rest of the VAPs, just as you would after a new installation.

Changing the maximum number of connections

When you specify the maximum number of connections reserved for Macintosh users in MACSETUP, that number applies collectively to all target file servers configured on the current VAP host. (For more information on using MACSETUP, see "About MACSETUP" on page 54.) These connections are assigned on a "first-come first-served" basis as Macintosh users log in to target file servers through the VAP host. For example, suppose SERVER_A and SERVER_B are both target file servers and the VAP host has a maximum of 80 connections configured. If SERVER_A has 40 Macintosh logins, a maximum of 40 users can log in to SERVER_B at that time; if SERVER_A has 60 current Macintosh logins, SERVER_B will allow only 20 to log in; and so forth.

To change the number of connections allowed in all target file servers, do the following:

1. **Launch MACSETUP on the VAP host.**
2. **Choose "Install/Configure File Services" in the main menu.**

   This opens the "File Services Options" menu.
3. **Choose "Prepare File Service Gateway."**

   This brings up the "File Services Options" menu. In this menu, choose "Select Target File Servers "and press <Enter>. This opens a dialog box prompting for the maximum number of connections.
4. **Enter the new maximum number of connections.**

   Then press <Enter>. In the next window, press <Esc> as necessary to quit MACSETUP.
5. **Reboot the VAP host.**

Deleting NetWare for Macintosh from the current VAP host

To delete NetWare for Macintosh from a VAP host, follow the steps below. (Note that all commands shown below must be terminated by pressing <Enter>.)

1. **Verify that there are no Macintosh clients logged in.**
2. **Launch MACSETUP and delete the AppleTalk print queues.**

   Please see "Deleting an AppleTalk print queue" on page 119. When you have deleted the queues, exit MACSETUP.
3. **Delete the VAPs.**

   To delete the VAPs, CD to the SYS:SYSTEM directory and type these commands:

```
DEL AFPSPG.*
DEL APSVAP.*
DEL AQSVAP.*
DEL ATALK*.*
DEL AARP*.*
DEL RCFG.*
```

If the file server is a router, you will also need to type this command:

```
DEL RTRCFG.*
```

4. **Delete the configuration files.**

   Search the SYSTEM subdirectories for the NetWare for Macintosh configuration files (using NDIR), then CD to the directory containing the files and type these commands:

   ```
   DEL AT*.*

   DEL *.FNT
   ```

5. **If the VAP host is also a target file server, delete the DESKTOP.**

   To delete the DESKTOP from the root of each volume, open the volume from the DOS client and type these commands:

   ```
   CD DESKTOP

   DEL *.DTM

   CD..

   RMDIR DESKTOP
   ```

Chapter 4. Installation on an external router

This chapter explains how to install and configure the NetWare for Macintosh VAPs on a NetWare v2.2 external router.

A NetWare external router allows communication between different IPX LAN networks by routing data packets along the most efficient path between networks. (Formerly, these routers were called "bridges" by Novell, but we have changed the name to router in order to conform to industry standard conventions.) For a discussion of routers and bridges see the NetWare v2.2 *Concepts* manual.

The NetWare v2.2 router does not perform AppleTalk routing.

Installation overview

The installation procedure involves logging in as supervisor to a NetWare file server from a DOS client and running the programs shown in FIGURE 4-1.

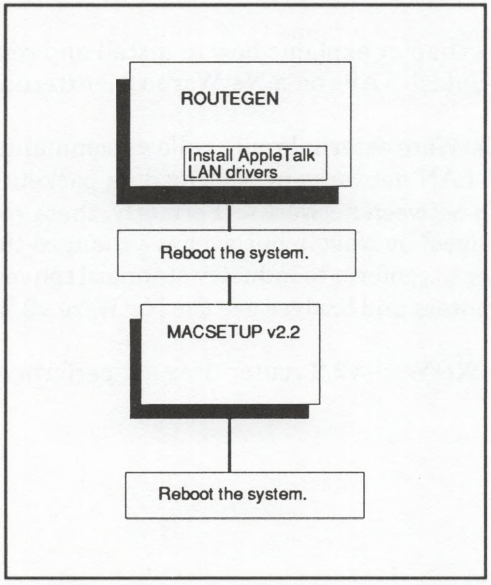


FIGURE 4-1 Installation on a router

About ROUTEGEN

When you use ROUTEGEN to configure a NetWare router to support AppleTalk, you should be aware of the requirements described in this section.

Note: Real-mode routers, which support 640K base memory only, *cannot* run the NetWare for Macintosh software. Only protected-mode routers, which support extended memory, can be configured as VAP hosts. While you can select non-dedicated mode (allowing both a router and a workstation to function on the same computer), we strongly suggest that you select dedicated mode (where a router only operates on the computer).

Where to find ROUTEGEN instructions

You will use ROUTEGEN to generate a router. For instructions refer to NetWare v2.2 *Installing and Maintaining the Network.*

Installing an AppleTalk LAN driver

After invoking ROUTEGEN, open the "Driver Installation" window Choose a driver name that includes "with AT 1" or "with AT 2." For example, to install an AppleTalk LAN driver on a Token Ring adapter, choose

```
IBM Token Ring W/AT II
```

When to use AppleTalk Phase 2

AppleTalk Phase 2 extends the basic AppleTalk protocol suite for high-speed media such as Token Ring and Ethernet, which can support a large number of devices. Note the following:

- ARCnet and LocalTalk support only Phase 1 drivers. (LocalTalk and ARCnet LANs are not high-speed media.)
- Token Ring supports only Phase 2 drivers.
- Ethernet can support either Phase 2 or Phase 1.

If you are configuring AppleTalk Phase 2 on Ethernet, make sure all Phase 2 routers on the cable comply with Phase 2. If the network is being upgraded from AppleTalk Phase 1 to Phase 2, AppleTalk routers might be configured to support routing between these two versions of AppleTalk (for example, using Apple Computer's *Upgrade Utility*), but this is usually a temporary situation until all devices have been upgraded to support Phase 2.

If you have installed a new LAN card

If you installed a new LAN card for use with AppleTalk, assign a NetWare address to the new LAN and configure the card's Base I/O and Interrupt. The NetWare installation instructions found in NetWare v2.2 *Installing and Maintaining the Network* provide details on NetWare addresses and card parameters.

Increasing the communication buffers

Macintosh clients use a greater number of these buffers than DOS clients do. Certain drivers, particularly ARCnet drivers, require an increased number of buffers. Symptoms of an insufficient number of communication buffers include routing errors from the file server, or the server dropping packets. If you see any of these symptoms, try increasing the number of communication buffers.

The NetWare installation instructions provide details on increasing communication buffers. This information is entered in the INSTALL program's "Operating System Generation" window. Please see "Where to find ROUTEGEN instructions" on page 53.

Before you begin

Before you begin installation, please read these tips:

- If you decide to set up a non-dedicated router (a computer which is functioning both as a DOS workstation and a router), make sure DOS CONFIG.SYS file does not contain the command BREAK=ON. Leaving the BREAK command set to ON could prevent your router from initializing correctly or prevent the VAPs from loading successfully.
- If you are running a dedicated router, we suggest you delete any AUTOEXEC.BAT or CONFIG.SYS files which might be on the computer. If you do not wish to delete these files, you should check it to make sure that they do not automatically load programs that will take up the computer's memory and thus cause memory problems when you run the router and try to load the VAPs.

About MACSETUP

MACSETUP is a menu-driven installation and configuration program for NetWare for Macintosh.

To use MACSETUP, you must be logged in to a NetWare file server as supervisor from a DOS client.

Note: You must use the MACINST program (v2.2) on the *MACINST* diskette to install MACSETUP. Previous versions of MACSETUP will not do all of the things described in this guide, and may cause error messages.

Using the MACSETUP menus

The following keys are used throughout the configuration process in MACSETUP:

<Enter>	In most cases, pressing <Enter> selects or writes configuration data and opens another window in MACSETUP. There are a few exceptions to this (noted in the sample instructions), where you must press <Esc> to write data.
<Ins>	Pressing <Ins> opens dialog boxes for entering new configuration data, such as additional file server names or queue names.
<Esc>	Pressing <Esc> usually exits a menu and pops you back to the preceding one. You can press <Esc> multiple times to exit MACSETUP.
<⇑><⇓>	Pressing the up-arrow and down-arrow key moves the selection to a different menu entry without selecting it. In some cases, pressing <Enter> will also move the selection to the next menu entry.
<Del>	Pressing <Del> removes a selected item.

How the VAPs and console commands are installed on a router

After you configure AppleTalk, file services, or print services using MACSETUP, you will down the router and then reboot it. The VAPs are loaded into the NetWare operating system from the MACINST diskette after you reboot the router.

MACSETUP configuration data

MACSETUP allows you to enter the configuration data described in this section. If you are not sure about the concept of target file servers or remote print queues, please see "NetWare file and print services" on page 164.

File services configuration data

In file services configuration, you will prepare target file servers by installing a hidden DESKTOP folder on each volume of each target file server. You will also provide the information the VAP host needs to advertise target file servers on the AppleTalk network.

You must be logged into a file server as supervisor to configure it as a target file server.

- Select the names of up to eight file servers and log in to install the DESKTOP folder. These will be target file servers.

You also need to provide the following information:

- Select the names of the file servers you configured as targets and add them to a list of current targets.
- Specify the maximum number of Macintosh connections allowed (between one and 100). Each Macintosh login session uses exactly one connection, and the NetWare v2.2 operating systems limits the total connections to 100. This means that a total of 100 Macintosh users can log in to the VAP host or through the VAP host to its target file servers. The connections are assigned on a "first-come first-served" basis to all Macintosh users that can access the VAP host.

Note: Print services may require up to 12 Macintosh connections, depending on the number of queues you configure, and other factors. You should keep this in mind when you specify the maximum number of Macintosh connections.

Depending on the AppleTalk network configuration, you might also need to do the following:

- Specify an AppleTalk alias for one or more target file servers. If you assign an alias, it will appear in the Macintosh Chooser instead of the file server's NetWare name. An alias is usually not required unless you have installed the Macintosh VAPs on more than one router (or server) and their configurations conflict. Please see "Solution: use aliases" on page 168 for details.

Print services configuration data

In print services configuration, you will create AppleTalk print queues, name the queues, enter the type of printer that will be assigned to the queues, and assign one or more printers to each queue.

You must be logged into a file server as supervisor to configure AppleTalk print queues on it.

- Select the names of up to eight file servers and log in to create AppleTalk print queues on those systems.

To create an AppleTalk print queue, you need to do the following:

- Specify a queue name. This name will appear in the Macintosh Chooser device list as if it were a printer name. In general, a queue name should indicate where a printer is located, or who has access to the printer.
- Choose an Apple printer type for each AppleTalk queue. (If you are unsure of which printer type to select, choose LASERWRITER.)
- Select the names of the AppleTalk print queues and add them to a list of served queues.

To attach a printer to a queue in MACSETUP, you need to

- Specify the name of the printer servicing a queue. This must be the name assigned to the printer by using *Apple Namer* software. If you do not know the printer's name, you can select the printer icon in the Macintosh Chooser. Its name will appear in the device list.

Depending on the AppleTalk network configuration, you might also need to

- Specify the AppleTalk zone name in which the printer resides. If the file server that processes the AppleTalk queue is in a different zone than the printer, you need to enter the printer's AppleTalk zone name. Otherwise, leave the default asterisk.

Note: Note that AppleTalk print queues created with MACSETUP must also be deleted with MACSETUP. Error conditions can result if you create a queue with MACSETUP and delete it using PCONSOLE.

NetWare for Macintosh configuration

This section provides examples that guide you through the steps in upgrading or installing and configuring NetWare for Macintosh on a router.

About router targets

You can select almost any kind of a NetWare server as a router target. Acceptable targets for an external router are NetWare v2.15, v.2.2, v.3.0, or 3.1 servers, *or* Portable NetWare servers. Any of these targets will provide the user with the full functionality of the v2.2 VAPs that are running on the host.

However, we strongly suggest you do not use a v3.11 server as a target server because Macintosh users will see "generic" icons, and double-clicking the icons will not open the appropriate icon. For a full discussion of this special consideration, please see Chapter 6 of NetWare for Macintosh v3.0 *Installation and Maintenance*.

Note: Whenever you use MACSETUP, it is important that you make sure all users except yourself are logged off the network. If another user is logged in while you are running MACSETUP, MACSETUP will probably terminate abruptly.

Example 1: Upgrading the VAPs

This example shows how to upgrade a NetWare for Macintosh router to support the v2.2 Macintosh VAPs without changing your existing configuration.

If you are upgrading to AppleTalk Phase 2, remember that you must install the Phase 2 driver before invoking MACSETUP.

1. **Go to a DOS client and log in to a NetWare file server as supervisor.**

   When you are configuring a router whose ROUTER.EXE is on diskette, you should choose a DOS client with two floppy drives if possible. This will allow you to leave the ROUTER.EXE diskette in one drive and insert the *MACINST* in the other.

2. **Install and launch MACSETUP on the file server.**

   To upload the latest version of MACSETUP from the *MACINST* diskette insert the diskette in the DOS client's A drive and type

   ```
   A:MACINST
   ```

   and press <Enter>. Then invoke MACSETUP by typing

   ```
   MACSETUP
   ```

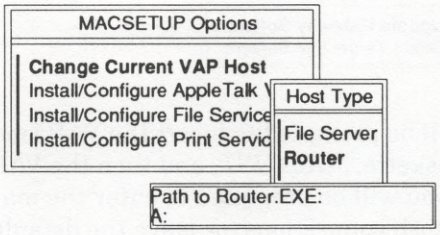
   and pressing <Enter>.

3. **Choose "Change Current VAP Host" in the main menu.**

   This opens a "Host Type" menu. Choose

   ```
   Router
   ```

   and press <Enter>.



This opens a dialog box prompting for the path to ROUTER.EXE. If ROUTER.EXE is on a diskette, insert this diskette in the A drive on the DOS client, leave the default "A:" and press <Enter>.

Otherwise, type the path to ROUTER.EXE, for example, "C:\", and press <Enter>.

4. **Choose "Install/Configure AppleTalk VAPs" in the main menu.**

   At this point, MACSETUP checks which AppleTalk drivers you installed (Phase 1 or Phase 2). Insert the *MACINST* diskette in the DOS client's floppy drive when MACSETUP prompts for it. You will see a "Please Wait" message while the new software is uploaded. Then press <Esc> as necessary to return to the main MACSETUP menu.

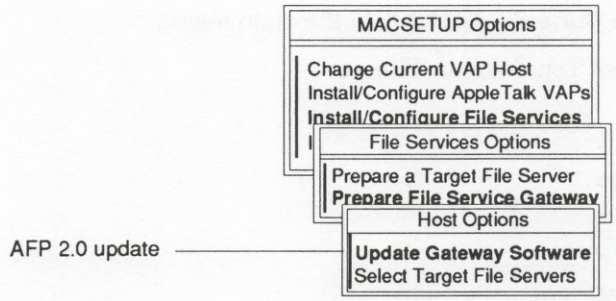
5. **Choose "Install/Configure File Services" in the main menu.**

   This opens the "File Services Options" menu. Choose "Prepare File Service Gateway" and press <Enter>.

   In the following menu, choose

   ```
   Update Gateway Software
   ```

   and press <Enter>.



You will be prompted to insert the VAP load diskette, the Router boot diskette, *MACINST*, and then the VAP load diskette again. Then you will be prompted to enter the maximum number of Macintosh connections (or leave the default as 20). Please see "File services configuration data" on page 56 for details.

When you press <Enter>, MACSETUP displays a "Current Targets" list showing all current target file servers. In this example, where you are not changing the file service configuration, press <Esc> as necessary to return to the main MACSETUP menu.

Note: If you wish to change your file service configuration, see "Configuring NetWare for Macintosh on a file server" on page 36.

---

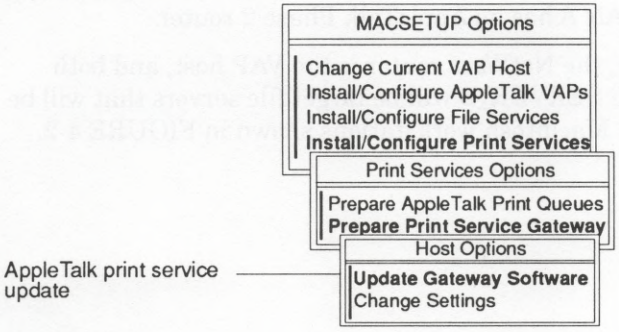
6. **Choose "Install/Configure Print Services" in the main menu.**

   This opens the "Print Services Options" menu. Choose "Prepare Print Service Gateway" and press <Enter>.

   In the next menu, choose

   ```
   Update Gateway Software
   ```

   and press <Enter>.



   If you have removed the *MACINST* diskette, re-insert it in the DOS client's floppy drive when MACSETUP prompts for it. You will see a "Please Wait" message while the new software is uploaded. Then MACSETUP displays a "Served Queues" list showing all current

print queues. In this example, where you are not changing the print service configuration, press <Esc> as necessary to return to the main MACSETUP menu.

7. **Press <Esc> to exit MACSETUP.**

   After you press <Esc> in the main menu, MACSETUP allows you to revoke your changes or choose to exit with the new AppleTalk configuration. To upgrade the VAPs, choose "Exit with New AppleTalk Configuration" and press <Enter>.

8. **Reboot the server and check that the installation is correct.**

   Please see "Loading the configured VAPs" on page 73 for details, andChapter 5 for information on installing the Macintosh workstation software and logging in to test the connection.

Example 2: Installing the VAPs on a router (with a Phase 2 router)

This example shows how to install and configure the VAPs on a NetWare router. Both LANs support AppleTalk Phase 2, but only the Ethernet LAN A has an AppleTalk Phase 2 router.

In this example, the NetWare router is the VAP host, and both SERVER_A and SERVER_B will be target file servers that will be accessible to all Macintosh workstations shown in FIGURE 4-2.

SERVER_A will process a queue attached to the "Igneous" LaserWriter shown on the LocalTalk LAN.

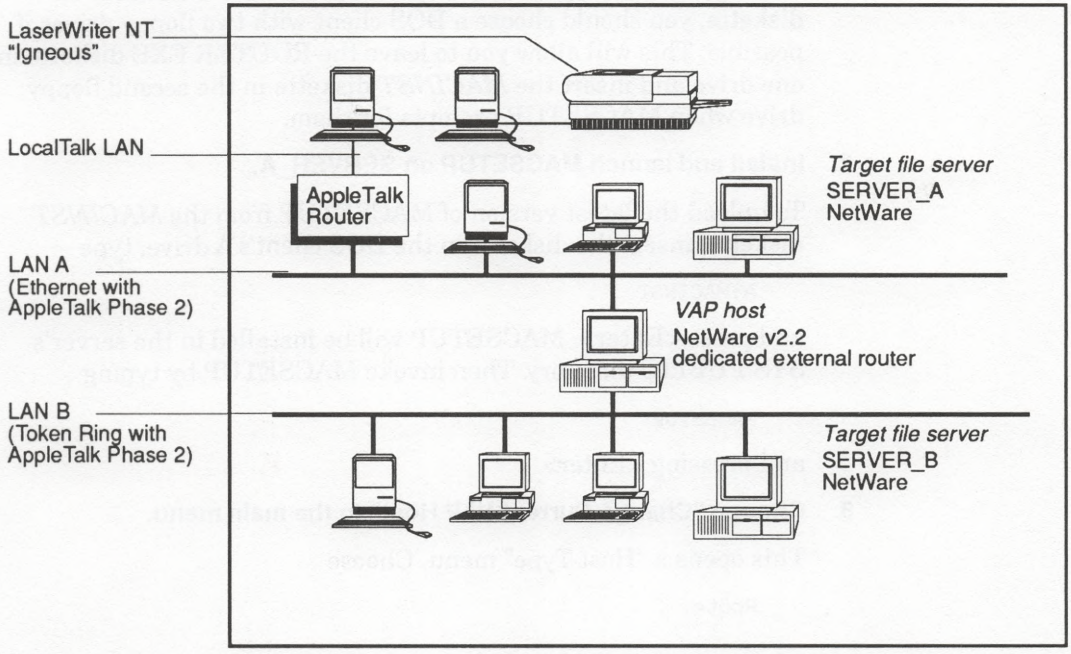


FIGURE 4-2 Example installation on a NetWare v2.2 router

In this example router installation, use ROUTEGEN to install the AppleTalk Phase 2 LAN drivers on LAN A and LAN B in the host router. Run ROUTEGEN and choose the proper driver from the list of drivers in the "Driver Installation" menus. For example, if LAN A uses the NE2000 LAN card, and LAN B is Token Ring, choose

```
NetWare NE2000 W/AT 2
```

for LAN A, and for LAN B, choose

```
IBM Token Ring W/AT II
```

1. **Go to a DOS client and log in to SERVER_A as supervisor.**

   When you are configuring a router whose ROUTER.EXE is on diskette, you should choose a DOS client with two floppy drives if possible. This will allow you to leave the ROUTER.EXE diskette in one drive and insert the *MACINST* diskette in the second floppy drive when MACSETUP prompts for them.

2. **Install and launch MACSETUP on SERVER_A.**

   To upload the latest version of MACSETUP from the *MACINST* diskette, insert the diskette in the DOS client's A drive, type

   ```
   A:MACINST
   ```

   and press <Enter>. MACSETUP will be installed in the server's SYS:PUBLIC directory. Then invoke MACSETUP by typing

   ```
   MACSETUP
   ```

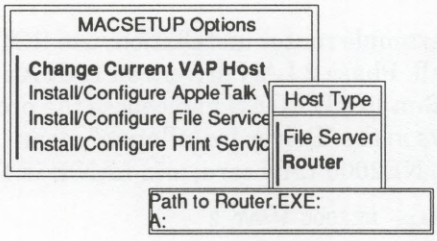
   and pressing <Enter>.

3. **Choose "Change Current VAP Host" in the main menu.**

   This opens a "Host Type" menu. Choose

   ```
   Router
   ```

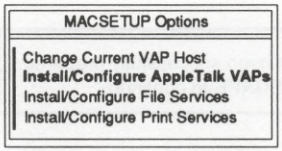
   and press <Enter>.



   This opens a dialog box prompting for the path to ROUTER.EXE. If ROUTER.EXE is on a diskette, insert this diskette in the A drive on the DOS client, leave the default "A:" and press <Enter>.

   Otherwise, type the path to ROUTER.EXE, for example, "C:\", and press <Enter>.

4. **Choose "Install/Configure AppleTalk VAPs" in the main menu and press <Enter>.**



You will be asked to insert the *MACINST* diskette and then will be prompted for a destination path for the VAPs. We suggest you use a blank, formatted high-density diskette; the VAPs require about 625 Kbytes of disk space. (This diskette will be called the "VAP load diskette" by MACSETUP.) If the VAP load diskette is in the DOS client's A drive, press <Enter> for Yes. Otherwise, type "N" and press <Enter> to be prompted for the correct path.

Finally, you will see a message that says the VAPs have been successfully installed. You are now ready to configure file and print services.

Configuring file services

In this example, both SERVER_A and SERVER_B will provide file services to Macintosh users.

As you follow these steps, insert the *MACINST* diskette in the DOS client's floppy drive when MACSETUP prompts for it.

5. **Choose "Install/Configure File Services" in the main menu.**

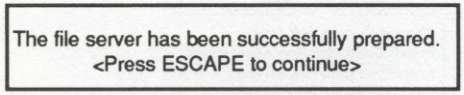
This opens the "File Services Options" menu.

5a. Choose "Prepare a Target File Server."

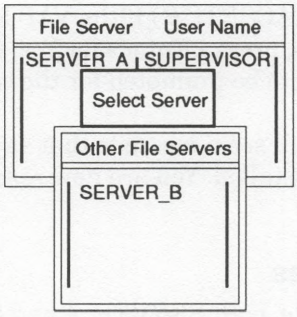
This opens a list of the NetWare file servers you are currently logged into and your user name on those servers. In this example, you are logged into SERVER_A as supervisor.

Select SERVER_A and press <Enter>. You will be asked to insert the MACINST diskette. (You may see a message that states that a desktop already exists on the selected volume and that the current desktop will be overwritten. It is all right to go ahead and overwrite the desktop. However, if you have any comments associated with files, those will be lost.)

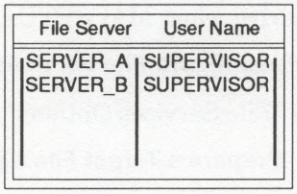
When the hidden DESKTOP folder has been installed at the root of each of SERVER_A's volumes, you will see this message:



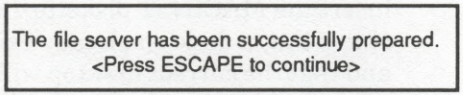
After pressing <Esc>, choose "Install/Configure File Services" and then "Prepare a Target File Server." To prepare SERVER_B as a remote target file server, press <Ins>, then select SERVER_B to login as supervisor.



When you have logged in, SERVER_B will be shown in the list of NetWare file servers you are currently logged into.



Select SERVER_B and press <Enter>. When the hidden DESKTOP folder has been installed at the root of each of SERVER_B's volumes, you will see this message:



Press <Esc> to continue.

5b. Choose "Install/Configure File Services."

This opens the "File Services Options" menu. In this menu, choose

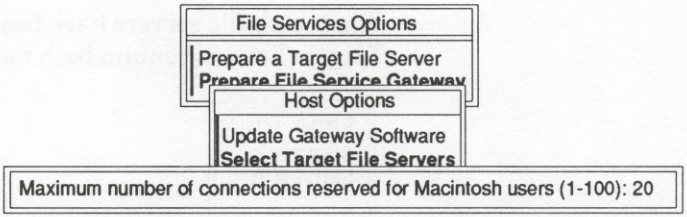
```
Prepare a File Service Gateway
```

and press <Enter>. You will be prompted to insert the VAP Load diskette and the MACINST diskette.

5c. Choose

```
Select Target File Servers
```

This opens a dialog box.


File Services Options
Prepare a Target File Server
Prepare File Service Gateway
Host Options
Update Gateway Software
Select Target File Servers
Maximum number of connections reserved for Macintosh users (1-100): 20

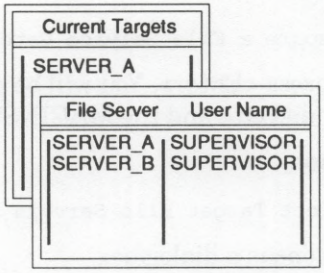
5d. Enter the maximum number of Macintosh connections.

For this example, leave the default as 20, and press <Enter>. (See "File services configuration data" on page 56 for information on Macintosh connections.) Pressing <Enter> opens a list of Current Targets.

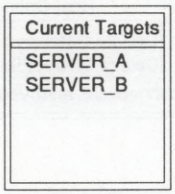
5e. Add the target file servers to the "Current Targets" list.

In a new ROUTER installation, the Current Targets list is empty. Press <Ins> to open a list of file servers you are logged into.

Select SERVER_A and press <Enter>, and then SERVER_B (followed by <Enter>) to add them to the Current Targets list:



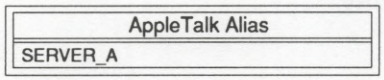
When both file servers have been selected, the Current Targets list will contain both names.



MACSETUP creates an entry in the ATFILES.CFG configuration file for each of the file servers you select from this list. In this example, select both SERVER_A and SERVER_B.

5f. If necessary, enter an AppleTalk alias.

Each time you select a server name from this list and press <Enter>, another dialog box comes up, prompting for an alias.



In this example, where you are configuring only one router to run the Macintosh VAPs, you do not need to enter an alias. Press <Enter>. The AppleTalk Alias box initially contains the selected target file server's NetWare name. If you enter a new name here, it will be used instead of the file server's NetWare name in advertising on the AppleTalk network. See "Solution: use aliases" on page 168 for details.

Press <Esc> as necessary to return to the main MACSETUP menu.

Configuring print services

In this example, SERVER_A will service an AppleTalk print queue attached to the "Igneous" LaserWriter NT shown in FIGURE 2-3 on page 40.

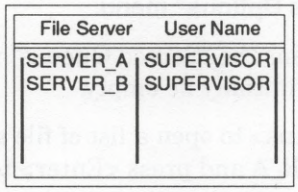
As you follow these steps, insert the *MACINST* diskette in the DOS client's floppy drive when MACSETUP prompts for it.

6. **Choose "Install/Configure Print Services" in the main menu.**

This opens the "Print Services Options" menu.

6a. Choose "Prepare AppleTalk Print Queues."

This opens a list of the NetWare file servers you are currently logged in to, and your user name on those servers:



In this example, SERVER_A will process AppleTalk print queues. This means you will select one of the servers first and create a queue for it, and then select the other server and create a queue for it.

6b. Select SERVER_A and create its print queue.

Selecting SERVER_A and pressing <Enter> opens a list of all the print queues on SERVER_A. In this example, the list is initially empty.

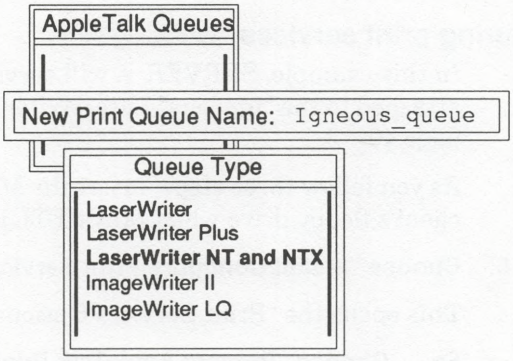
To create a new queue, press <Ins> and enter its name, for example,

```
Igneous_queue
```

then press <Enter>. This opens a list of the possible printer types that can service AppleTalk queues. In this example, select

```
LaserWriter NT and NTX
```

and press <Enter> to assign this type to the queue you just created.

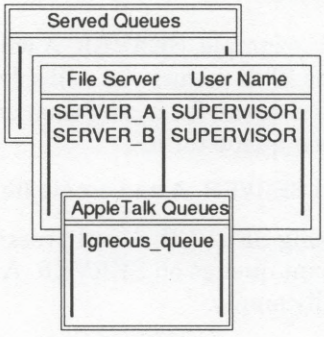


Press <Esc> to continue.

6c. Choose "Prepare Print Service Gateway" in the "Print Services Options" menu.

This opens the "Served Queues" window. In this example, the list will initially be empty.

Press <Ins> to open a list of file servers, and then select SERVER_A and press <Enter> to list AppleTalk queues.

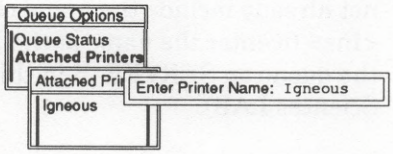


Select "Igneous_queue" in the list of AppleTalk queues, then press <Enter> to add this to the list of Served Queues.

Select "Igneous_queue" again in the "Served Queues" menu, and press <Enter>. This opens the "Queue Options" menu.

6d. Choose "Attached Printers" in the "Queue Options" menu.

This opens a list of printers on the network. If this list does not already include the name of the printer you need, press <Ins>, type the name of the printer, and press <Enter>.



The name you type must be the same name assigned to the printer using the *LaserWriter Namer* software (that is, the name that appears in the Macintosh Chooser). In this example (FIGURE 2-3 on page 40), the printer that will service the queue on SERVER_A is named "Igneous."

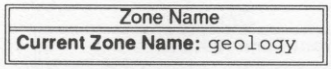
Pressing <Enter> adds the printer's name to the "Attached Printers" list. Select it in this list and press <Enter> to attach the printer to the queue. This opens the "Zone Name" dialog box.

6e. Enter the zone name for the printer.

Because the "Igneous" LaserWriter NT in FIGURE 2-3 on page 40 is in a different zone from SERVER_A, in this example you must specify the printer's zone name. Type

```
geology
```

and press <Enter>.

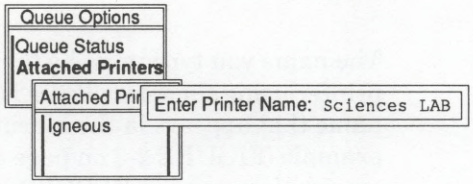


Note that this must be the zone in which the printer resides (in this example, the zone on the AppleTalk router's LocalTalk interface).

Press <Esc> as necessary to return to the "Print Services Options" menu.

6f. Choose "Attached Printers" in the "Queue Options" menu.

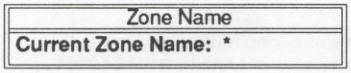
This opens a list of printers on the network. If this list does not already include the name of the printer you need, press <Ins> to enter the name of the LaserWriter NT attached to the queue on SERVER_B in this example (the printer named Sciences LAB).



Pressing <Enter> adds the printer's name to the "Attached Printers" list. Select it in this list and press <Enter> to attach the printer to the queue. This opens the "Zone Name" dialog box.

6g. Leave the default asterisk in the zone name field.

Because LAN B in this example does not support a Phase 2 router, there are no AppleTalk zones configured on this network. This means that all AppleTalk devices on this LAN are in the same "default" zone, so the LaserWriter is in the same zone as SERVER_B.



Leave the default asterisk to indicate that SERVER_B and the printer servicing its AppleTalk queue are in the same AppleTalk zone. Press <Esc> as necessary to return to the main menu.

7. Press <Esc> to exit MACSETUP.

After you press <Esc> in the main menu, MACSETUP allows you to revoke your changes or confirm the new configuration. Choose "Exit with New AppleTalk Configuration" and press <Enter>.

8. **Use the modified ROUTER.EXE disk to reboot the router, then check that the installation is correct.**

   Please see "Loading the configured VAPs," next.

Loading the configured VAPs

To load the configured VAPs on the router:

1. **Reboot the router from the ROUTER.EXE diskette and type**

   ```
   Router
   ```

   to invoke ROUTER.EXE. You can actually reboot from any DOS diskette and then insert the ROUTER.EXE diskette, if this is more convenient.

2. **You will be prompted to insert the diskette that contains the VAPs.**

   Press any key to initiate the VAPs loading. As each VAPloads, a message will be displayed on the screen.

Verifying the MACSETUP installation

After you have supplied the configuration data required for your network and rebooted the file server, use the VAP console command to verify that the proper VAPs have been installed. At the router console, type

```
VAP
```

and press <Enter>. This lists the VAPs (including their version number) and Macintosh console commands running on the server. For example, if you have installed AppleTalk Phase 2, file services, and print services, the VAP command lists something like this:

```
Dayna AppleTalk 2 Address Resolution Protocol (AARP2) V2.2
Dayna AppleTalk 2 VAP (ATALK2) V2.2
Dayna AppleTalk Queue Gateway (AQSVAP) V2.2
    QLIST
    PUBLISH
    UNPUBLISH
Dayna AppleTalk Print Server (APSVAP) V2.2
    ATTACH
    DETACH
    START
```

```
    STOP
    KILL
    PLIST
    QUERY
Novell AppleTalk Filing Protocol Gateway (AFPSPG) V2.2

NetWare Router Reconfiguration VAP (RTRCFG) v2.2
RECONFIG
SHOW
```

Chapter 5 Installing a Macintosh client

After you have installed and configured NetWare for Macintosh file services and print services on a file server or bridge, you should test the configuration by logging into a target file server from a Macintosh client and sending a print job to an AppleTalk print queue.

This chapter describes how to install the client workstation software on a Macintosh workstation, including the NetWare for Macintosh utilities. It also describes how to log into a file server and send a print job to a queue.

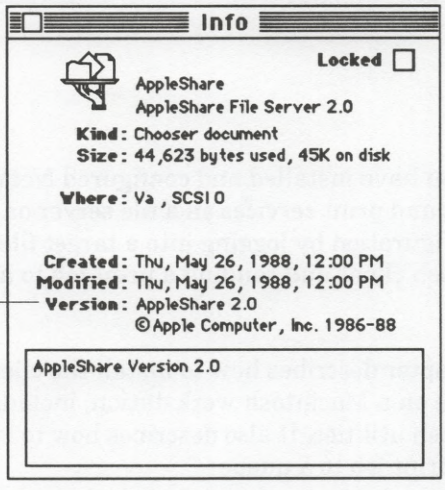
Checking and installing the workstation software

Apple Macintosh clients must be running the *AppleShare Workstation* software Version 2.0 or above. This software is supplied with every Macintosh computer on a diskette labeled *AppleShare Workstation Installer* or *System 6.n Software Installer.*

If you do not have the *AppleShare Workstation* software or if you have an outdated version, please contact your Apple dealer.

To check that the proper AppleShare software is installed on the Macintosh startup disk, open the System Folder. You should see the AppleShare icon. If the AppleShare icon is not present in the System Folder, you need to install the workstation software. If the icon is present, click the AppleShare icon and select Get Info from

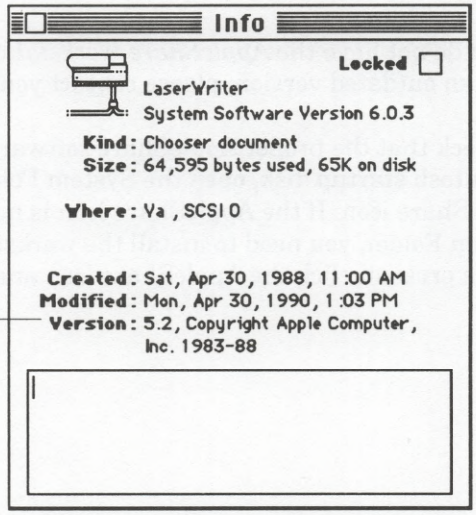
the File menu to bring up information about the AppleShare software:



Version number

If the Macintosh will print to a network printer, it must be running LaserWriter Version 5.2 or above or ImageWriter Version 2.7 or above. If connected to the printer port on a NetWare file server or bridge, an ImageWriter's driver must be the AppleTalk version.

Click once on the LaserWriter or the ImageWriter icon in the System Folder, then select Get Info from the File menu.

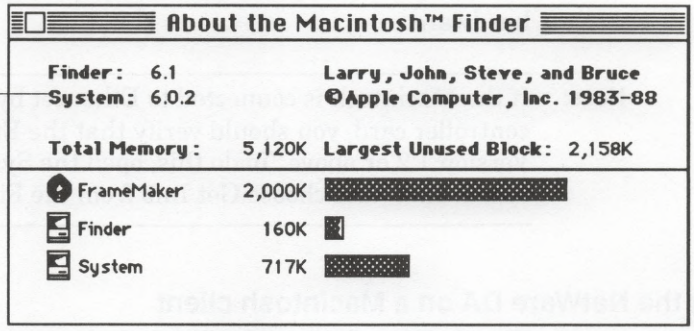

Info
Locked
LaserWriter
System Software Version 6.0.3
Kind: Chooser document
Size: 64,595 bytes used, 65K on disk
Where: Va , SCSI 0
Created: Sat, Apr 30, 1988, 11:00 AM
Modified: Mon, Apr 30, 1990, 1:03 PM
Version: 5.2, Copyright Apple Computer, Inc. 1983-88

Version number

Note: Note that all Macintosh workstations on the network should have the same version of print drivers. The ImageWriter driver must be the AppleTalk version, even if the ImageWriter printer is actually connected to a serial or parallel port on the NetWare server.

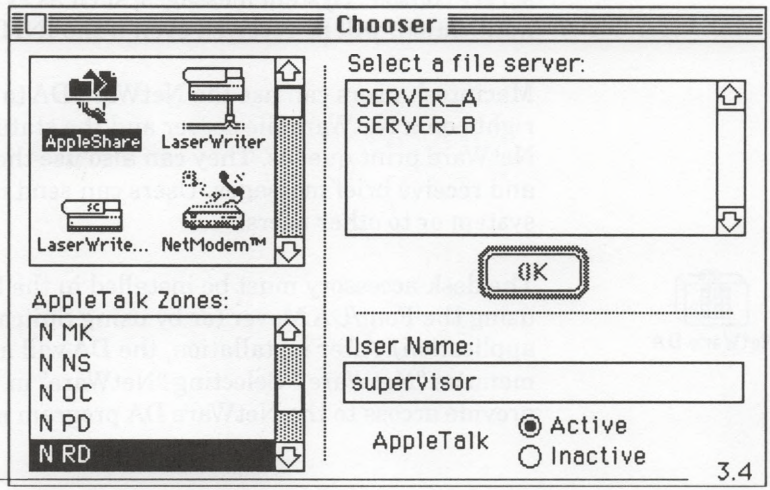
Checking the system software

Macintosh clients must be running System Version 6.0 or above and Finder Version 6.1 or above. To check this, choose About the Finder from the Apple (🍎) menu.



Version numbers are displayed for the System and Finder

To verify that the Macintosh has Chooser Version 3.3 or above, open the Chooser using the Apple (🍎) menu to check the version number in the lower-right corner.



Version number

Checking the network driver

A Macintosh that is connected to a LocalTalk (or equivalent) network automatically selects the "Built-in" AppleTalk software configuration, and you should not need to change this configuration if the Macintosh client is on LocalTalk.

If you have added a Macintosh client to an AppleTalk network other than LocalTalk, you need to install the AppleTalk driver. Then, open the Macintosh Control Panel from the Apple (🍎) menu, select the Network icon in the left column of the Control Panel, and choose the proper AppleTalk configuration (Phase 1 or Phase 2). This should be described in detail in the documentation that accompanies the LAN hardware.

Note: If the Macintosh is connected to Ethernet by using an Ethernet controller card, you should verify that the EtherTalk driver is Version 1.2 or above. To do this, open the System Folder, select "EtherTalk" and choose Get Info from the File menu.

Installing the NetWare DA on a Macintosh client

The NetWare DA is a Macintosh desk accessory that consists of a System document (the DA itself), an "About" module, and three program modules. A startup document (an INIT) is also required for the Macintosh user to receive messages from other users or the file server console. System messages, such as system shutdown notification, will be received even if the INIT is not installed.

Macintosh users can use the NetWare DA to view their security rights on a NetWare file server and the status of their print jobs in NetWare print queues. They can also use the NetWare DA to send and receive brief messages. Users can send messages to their own system or to other users.

The desk accessory must be installed in the Macintosh system by using the Font/DA Mover (or by using Suitcase or a similar application). After installation, the DA will appear in the Apple (🍎) menu as "NetWare." Selecting "NetWare" in the Apple menu provide access to the NetWare DA program modules.

Notify

The Notify INIT must be copied into the Macintosh System Folder. The Notify icon will then appear briefly at the bottom of the screen when the Macintosh starts up. (Holding down the mouse button or the "N" key during startup will prevent the INIT from loading. The Notify icon will then have an "X" over it.) This INIT polls for the receipt of brief messages from other NetWare users and from the NetWare console, and displays messages on the Macintosh screen.

The NetWare DA's program modules can be copied to any convenient location, including a folder on the file server. When you invoke the desk accessory for the first time, it looks in the Macintosh System Folder for its modules. If it doesn't find them there, the DA prompts you to click the Setup button and enter the path to their location. The location you specify is remembered in subsequent Macintosh system reboots.

About

Rights

Print Queue

Message

The NetWare desk accessory includes the following modules:

- The About module displays information about the NetWare DA.
- The Rights module displays NetWare rights. If a user has sufficient rights, he can change his own or other's rights by using the DA Rights module. It is important that Macintosh users view and set security using the Rights module instead of the AppleShare utilities.
- The Print Queue module allows a user to view print jobs in a NetWare queue. Print queue operators can modify the queue by rearranging job priorities, placing jobs on hold, or deleting a job from the queue.
- The Message module allows a user to send and receive brief messages to other NetWare users who are logged into a NetWare file server. The Notify INIT polls for and displays these messages.

Before you install the NetWare DA, make a backup copy of the Macintosh Utilities distribution diskette, and put the original in a safe place. You can then follow these steps to install the DA on a Macintosh client:

1. **Insert your copy of the Macintosh Utilities diskette in the Macintosh floppy drive.**
2. **Double-click the diskette's icon to open it.**

3. **Install the DA in the Macintosh system.**

   Double-clicking the NetWare DA suitcase icon launches the Font/DA mover.

4. **Drag the Notify INIT to the System folder.**

5. **Drag the DA modules to the System folder or to any folder that will be accessible to the user.**

   If you place the modules in a folder other than the System folder, you will be prompted for the modules' location after you restart the Macintosh and invoke the NetWare DA.

6. **Restart the Macintosh.**

Connecting to a NetWare file server

After checking the physical and software network connection on the Macintosh client, log into the NetWare file server as supervisor to make sure the connection is working. To log in as supervisor using the Macintosh Chooser, open the Chooser from the Apple (🍎) menu, and click the AppleShare icon in the Chooser dialog box.

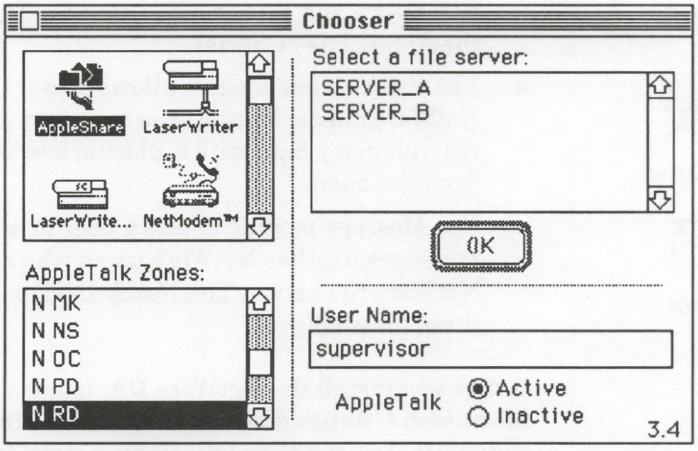


FIGURE 5-1 Logging in by using the Chooser

The file server's name (or alias) should appear in the "Select a file server" list. If the server's name does not appear, make sure you

have selected the correct AppleTalk zone. See Chapter 8 if the server name still does not appear.

For full instructions on logging in and out of the server by using the AppleShare dialog boxes, please refer to Chapter 1 in NetWare for Macintosh v2.2 *Basic Operations.*

When you have logged in and closed the Chooser, the NetWare file server's volume icon will appear on the Macintosh desktop. To open the volume, double-click its icon.

Note that you can click the selection box in the AppleShare login boxes to open a volume automatically when the Macintosh starts up.

To log out from a NetWare file server, drag the volume icon to the Trash on the Macintosh desktop. If more than one volume is open on a file server, you must drag all the server's volume icons to the Trash to log out.

Creating a Macintosh applications folder

To create a folder for Macintosh applications that will be accessible to Macintosh users on the file server, use the "New Folder" command in the File menu to create a new Empty Folder at the root of the SYS volume. You can then name the folder (for example, MACAPPS) by clicking the empty folder and typing the new name. If you wish, double-click the folder to open it, and create nested folders for categories of Macintosh applications (for example, "WP" for word processing). In Chapter 6 you will learn how to set rights for folders so that you can control access to the folder.

Installing the NetWare Control Center

The NCC is an application and can be copied to any convenient location (for example, an application directory on the file server, or the Macintosh desktop). If you prefer, you can leave the NCC on your copy of the *Macintosh Utilities* diskette and run it from there.

Because the NCC is mainly an administrative tool, many administrators simply elect to keep the NCC on their own Macintosh.

To install the NCC on the file server,

1. **Insert your copy of the Macintosh Utilities diskette in the Macintosh floppy drive.**
2. **Double-click the diskette's icon to open it.**
3. **Drag the NCC icon to the new MACAPPs folder.**

   A successful file copy provides a functional test of Macintosh-to-NetWare connection. If the drag-copy does not succeed, please see Chapter 8, "Troubleshooting."

   See Chapter 6 for instructions on using the NCC to assign security rights, create user logins and groups, and perform other management tasks from a Macintosh.

Testing AppleTalk print queues

After checking that the AppleTalk printer is connected and powered on, do the following:

1. **Select Chooser from the Apple (🍎) menu.**

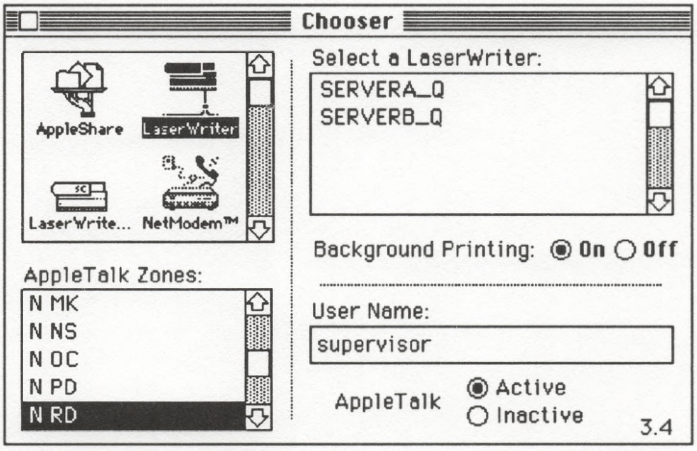
   If there is an AppleTalk router on the network with AppleTalk zones configured, choose the zone in which the printer resides.

2. **Click the LaserWriter or ImageWriter icon in the Chooser dialog box.**

   The print queue name you created during print service configuration should appear in the LaserWriter list. If both the Macintosh and printer are on the same LocalTalk network, the Macintosh should be able to see both the queue and the printer; otherwise, it should see only the queue. If the queue does not appear, or if you see an error message when you select it, see Chapter 8.

3. **Make sure the AppleTalk Active button is selected.**
4. **Select a NetWare queue.**

NetWare queue names appear in the "Select a LaserWriter" list along with other queues that might be available in the selected zone. Usually the queue name indicates to the user where the printer is located.



5. **Close the Chooser.**

   You close the Chooser by clicking the close box in the upper left corner.

6. **Send a sample print job.**

   For example, choose "Print Directory" from the File menu to print the current directory listing.

Chapter 6. Using the NetWare Control Center

This chapter describes how to use the NetWare Control Center (NCC) Macintosh utility to create or delete user logins and groups and to manage data security on a file server running NetWare v2.2 or later.

Note: While the NCC allows you to perform many NetWare administrative functions, there are some that can be performed only from a PC client or from the console. For information on tasks that are not covered in this chapter, please refer to NetWare v2.2 *Using the Network.*

Most administrative tasks on a file server require you to be logged in as supervisor. However, users with supervisor equivalence or with the rights to set security can perform many of the tasks described in this chapter.

Launching the NetWare Control Center

NetWare Control Center

You can launch the NetWare Control Center (NCC) from a hard drive, diskette, or NetWare file server by double-clicking its icon. If you are not already logged into a file server as supervisor, you can log in by using the Macintosh Chooser before launching the NCC. If you prefer, you can log in after the NCC has opened the Server window (FIGURE 6-1).

When you launch the NCC, it looks for a preference file in the Macintosh System folder. (The preference file contains the name of a default zone you have selected.) If it finds the preference file, it opens a window showing the file servers in the default zone (FIGURE 6-1).

Note: Creating a preference file by selecting a default zone greatly reduces the launch time of the NCC. Please see "Setting the default zone" on page 87 for information on creating the preference file.

If the NCC does not find a preference file, it first scans the local zone for NetWare file servers that can be accessed from Macintoshes and then opens a window showing those file servers. Then, if it does not find any local file servers, the NCC begins checking all available zones for NetWare file servers that can be accessed from your Macintosh. This process can take several minutes on a large AppleTalk internet.

If the NCC does not find any NetWare file servers, it displays a message; otherwise, it opens a Server window and displays an icon for each file server it finds:

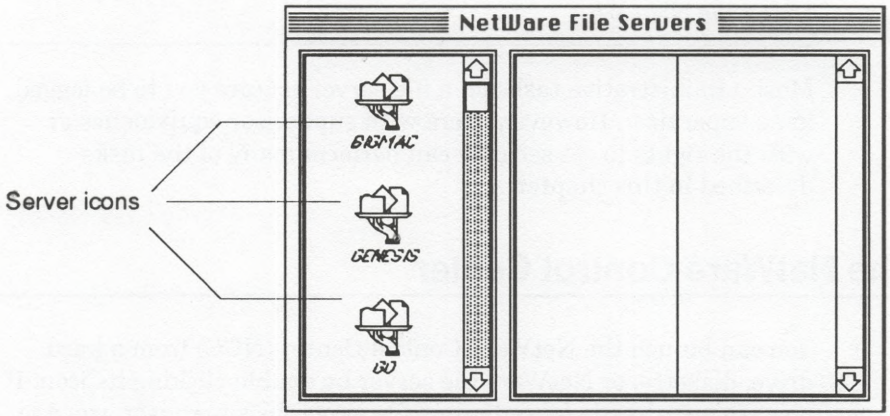
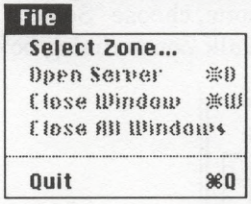


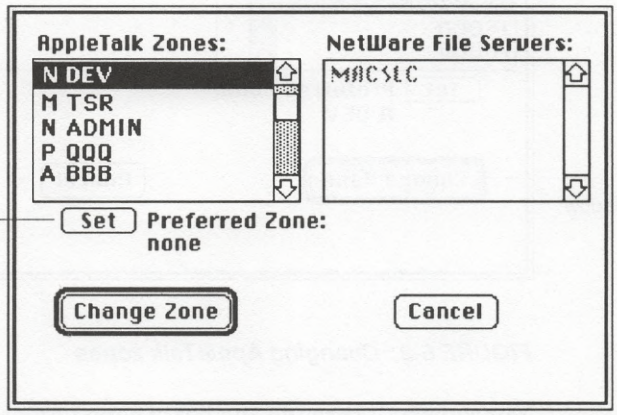
FIGURE 6-1 The server window

Setting the default zone



To create a preference file that will set a default zone, launch the NCC and choose "Select Zone..." from the File menu.

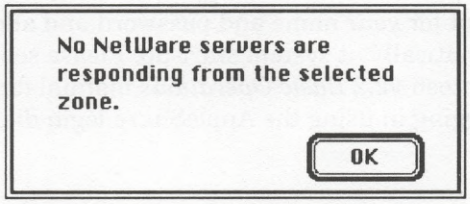
This displays a dialog box for selecting a default zone. You can also use this dialog box to change zones (opening a Server window for file servers in that zone), or to set a new default zone.



Click the Set button to set the default zone

Choose a zone name from the "AppleTalk Zones" list. If the selected zone contains NetWare file servers that can be accessed from Macintoshes, the name of the server(s) will appear dimmed in the "NetWare File Servers" list. Click the Set button to set the default zone.

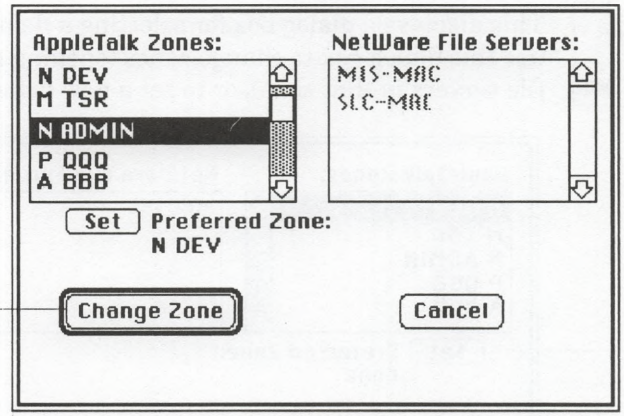
If you select a zone that contains no NetWare file servers that can be accessed from a Macintosh, and then click Set, you will see the message:



In this case, click OK, choose another zone, and click Set. Click "Change Zone" to exit the window.

Viewing file servers in another AppleTalk zone

To log into a file server in another AppleTalk zone, choose "Select Zone..." from the File menu to open the AppleTalk Zones dialog box.



Click Change Zone to open a Server window for another zone

FIGURE 6-2 Changing AppleTalk zones

You can scroll through the list of zone names on the left of the dialog box to find a new AppleTalk zone. A list of all file servers that are currently up and running in the selected zone will be displayed in the scroll box on the right.

Logging in to a file server

To log into a file server using the NCC, double-click its icon in the Server window, or click its icon and choose "Open Server" from the File menu.

This opens the standard AppleShare login dialog boxes, which prompt for your name and password and allow you to log in automatically at system start-up. Please see the NetWare for Macintosh v2.2 *Basic Operations* manual for detailed instructions on logging in using the AppleShare login dialogs.

When you have logged in to the server, the Server window displays icons that you can double-click to obtain information about users, groups, and volumes on that server, as shown in FIGURE 6-3.

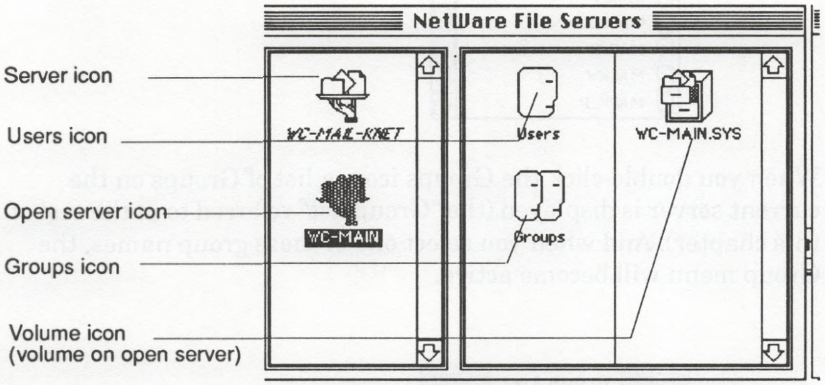
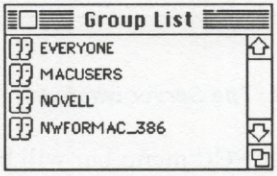


FIGURE 6-3 The Server window

And the full NCC menu bar will be displayed. Note that a number of menus are gray, including the Volumes, Folders/Files, Users, and Groups menus.

These menus become active when they are available for your use. For example, when you double-click the Users icon, a list of users on the current file server is displayed. (This is the "User list" referred to in the rest of this chapter.) If you select a user, then the User menu will become active.

When you double-click the Groups icon, a list of Groups on the current server is displayed (the "Group list" referred to in the rest of this chapter). And when you select one of these group names, the Group menu will become active.



When you double-click a volume icon, a list of folders and files at the root of that volume is displayed. (And when you select a folder or file from that list, the Folders/File menu becomes active.)

Server icons are displayed using the following conventions:

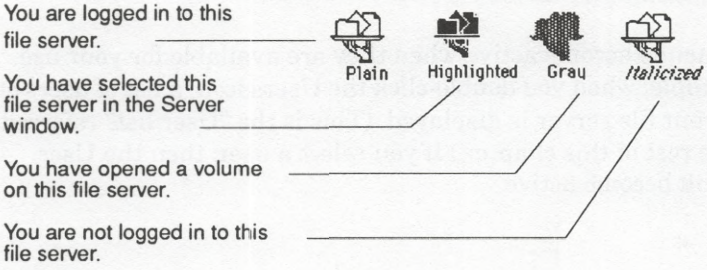

You are logged in to this file server.
Plain
Highlighted
Gray
Italicized
You have selected this file server in the Server window.
You have opened a volume on this file server.
You are not logged in to this file server.

FIGURE 6-4 Server icons

Creating user login accounts and groups

If you do not already have a clear idea of the user logins you need to create, the groups they should belong to, and the folders they will need to access on the server, you will save time by planning this information; for example, create a table such as the one shown below.

New Users	*Roee*	*Rachel*	*Sam*	*Duncan*	*Lindsay*
Folders					
Art Clips	✓		✓	✓	
Engineering Specs		✓			✓
Mac Applications	✓	✓	✓	✓	✓
Marketing Blurbs			✓		
Groups					
Engineering		✓			✓
Computer Services	✓	✓			✓
Art Department	✓		✓	✓	

You can create groups first if you prefer, but these instructions assume that you will create user login accounts first, then create new groups if necessary and add users to them.

Adding new user logins

To add a new user, log into the file server and double-click the Users icon in the Server window (FIGURE 6-3 on page 89). This opens a list of users (if any) who already have login accounts on the file server.

1. **Choose Create a New User from the NCC's Users menu.**

   This opens the User Information Window.

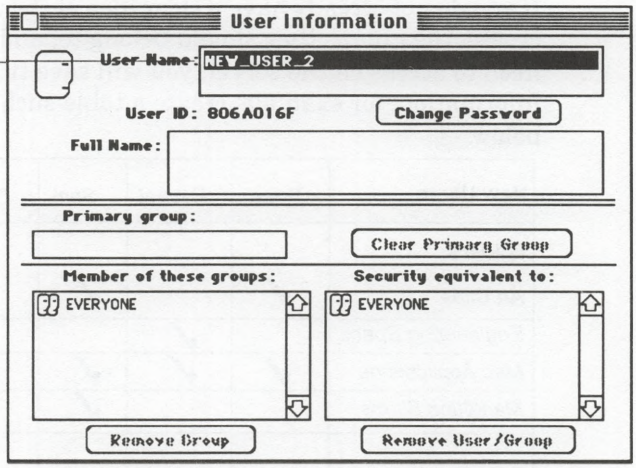


FIGURE 6-5 User Information window

2. **Type the user's login name in the User Name field.**

   You can also enter the user's full name or any other useful information using up to 127 characters in the Full Name field.

   The new user's NetWare ID is automatically generated and a folder with that ID will be created in the MAIL folder.

More about the User Information window

The User Information window (FIGURE 6-5 on page 92) displays group and security information about each user on the current file server.

To open the User Information window, double-click the Users icon in the Server window to bring up the Users List. You can then either double-click a user's name in the User List or select a name from the list and choose User Information from the Users menu.

Assigning a temporary password

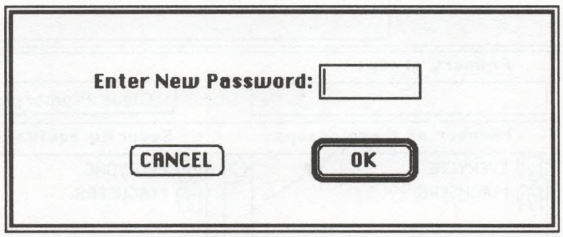
It is a good idea to assign a temporary password of up to eight characters to any new user accounts you create. If you have not previously specified a password requirement on this server (by

using the SYSCON utility), NetWare will accept a blank password for new users and allow any user to create a password for subsequent logins. However, this creates a temporary breach of security on the file server.

To assign a user password, do the following:

1. **Click Change Password in the User Information window (FIGURE 6-5 on page 92).**

   This opens the password dialog box:



2. **Enter a new password.**

   A password can be up to eight characters in length, with no special characters included. The system is not case-sensitive, so it does not matter if you enter upper or lower case letters in passwords. You will be prompted to re-enter the new password and told when the password is successfully changed.

   Users can change their own passwords at login time by using the Set Password button in the AppleShare login box. This procedure is described in NetWare for Macintosh v2.2 *Basic Operations*.

Adding a new user to an existing group

A new user is automatically a member of the group EVERYONE. You can make the user a member of other groups that have already been defined in this file server as described below.

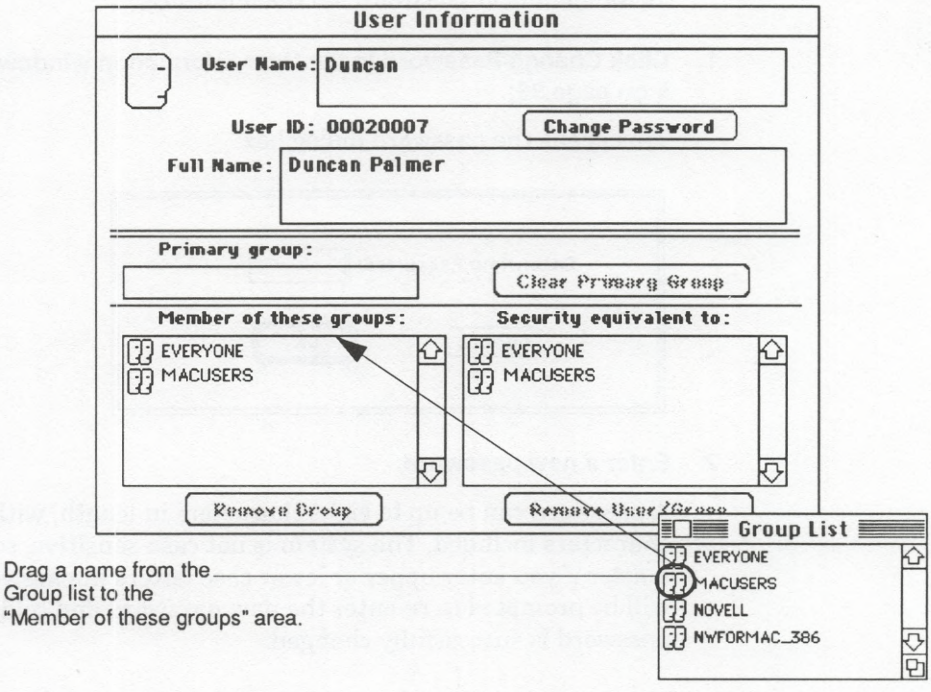
See "Creating a new group and adding users to it" on page 95 for another way of adding group members.

Leaving the User Information window (FIGURE 6-5 on page 92) open, do the following:

1. **Double-click the Groups icon in the Server window (FIGURE 6-3 on page 89).**

   This opens the Group List.

2. **Drag a name from the Group list as shown:**



Creating home folders for one or more new users

As supervisor, you can use the Create Home Folder function to create home folders for users. A new folder with each user's login name will be placed in the USERS folder on the SYS volume of the current file server. If no USERS folder exists, one will automatically be created with all rights (except on a NetWare v3.0 file server, whether the Supervisory right is not granted).

Note that this function creates home folders only on the SYS volume. If you would like home folders on other target volumes, you can either copy them from the SYS volume or create new ones.

To create home folders on the SYS volume, do the following:

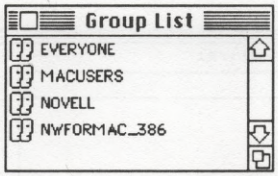
1. **Open the User List by double-clicking the Users icon in the Server window (FIGURE 6-1 on page 86).**
2. **Choose the names of one or more users.**

   You can shift-click to choose multiple users.
3. **Choose Create Home Folder from the User menu.**

   The home folder for each user will have full rights for that user.

Creating a new group and adding users to it

To create a new group, log into the file server and double-click the Groups icon in the Server window. This opens a list of groups (if any) that have already been defined this file server.



1. **Choose Create New Group from the Groups menu.**

   This opens the Group Information Window.

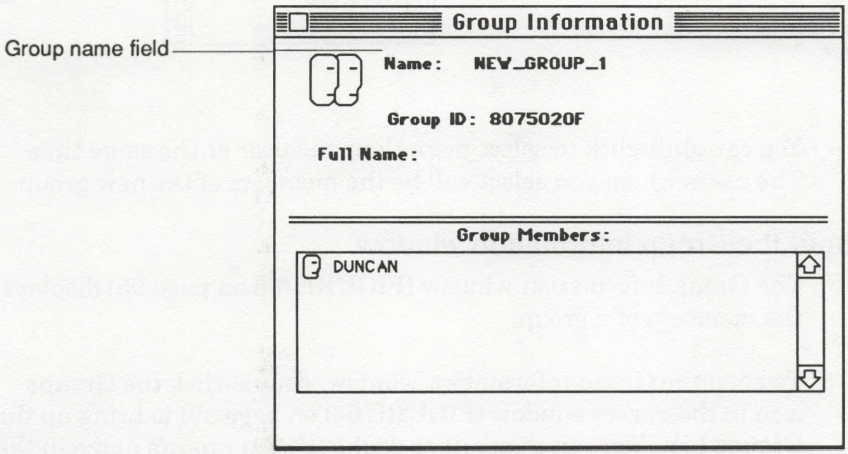


FIGURE 6-6 Group Information window

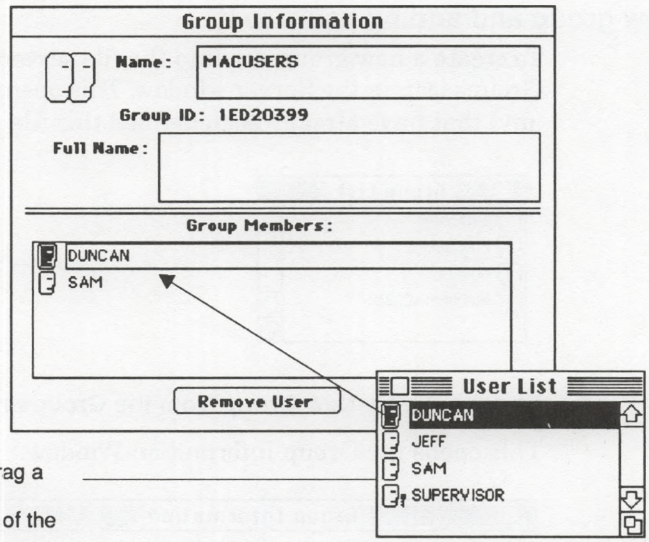
2. **Type the name of the new group in the Name field.**

   The group name can be up to 47 characters long.

3. **Double-click the Users icon in the Server window**

   Alternatively, to bring up the Users List, you can choose User Information from the Users menu.

4. **Drag user names from the User List as shown:**



To add a group member, drag a name from the user list to the "Group Members" area of the Group Information window.

You can shift-click to select more than one user at the same time. The users whom you select will be the members of the new group.

More about the Group Information window

Groups

The Group Information window (FIGURE 6-6 on page 95) displays the members of a group.

To open the Group Information window, double-click the Groups icon in the Server window (FIGURE 6-3 on page 89) to bring up the Groups List. You can then either double-click a group's name in the list, or select a name from the list and choose Group Information from the Groups menu.

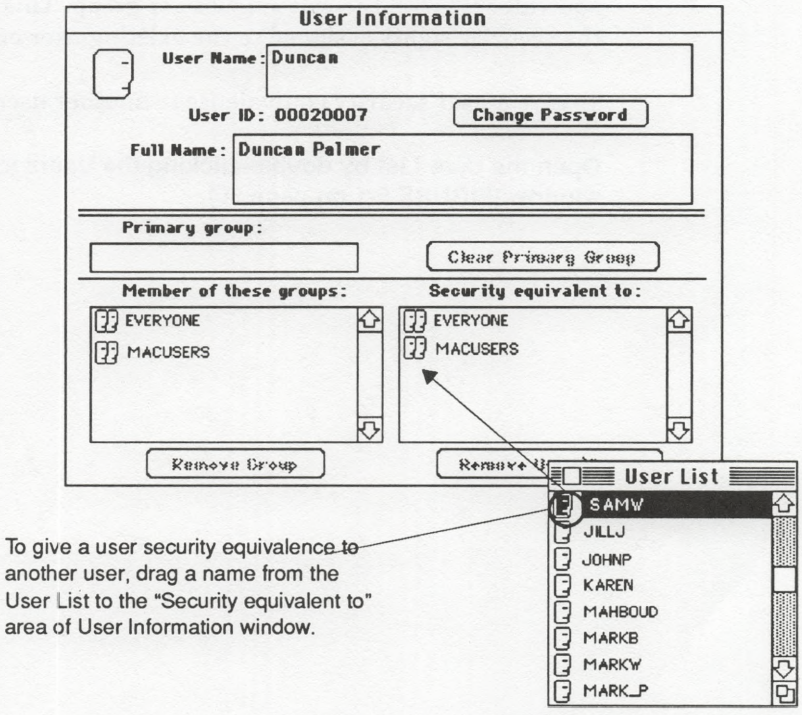
Using security equivalence to assign rights to a user or group

Security equivalence is a shortcut way to assign NetWare security rights to a new user. If the new user needs access to the same data as an existing user or group, you can grant the new user "security equivalence" with the existing user or group. This duplicates all of the security rights assigned to the existing user or group.

To give a user security equivalence to another user, do the following:

1. **Open the User List by double-clicking the Users icon in the Server window (FIGURE 6-1 on page 86).**

2. **Select the new user and open a User Information window.**
3. **In the User List, choose the name of a user who has security rights.**
4. **Drag the name from the User List as shown:**



Note that you can remove a security equivalence from a user's profile by selecting the name in the "Security equivalent to" list and clicking the Remove User/Group button below it.

You can also grant a new user security equivalence with the supervisor by dragging the supervisor name from the User list to the "Security equivalent to" area of the User Information area. This grants the user supervisory privileges, while still allowing users to

login under their original user names. Of course, you should limit these privileges to users who are administrators of a file server.

Setting up data security rights

After you have created user logins and groups, you should assign them the rights to access the data they need on the file server. The NCC allows you to grant trustee assignments, set the rights mask, and set folder and file attributes. For information about security see the "Security" section of the NetWare v2.2 *Concepts* manual.

Note: If there is a NetWare v3.0 (or later) server on your network, you can use the NCC to access it. However, since the security system is somewhat different on NetWare v3.0 servers than on NetWare v2.2 servers, the information you see will be different than what you see in this guide. Appendix B of NetWare for Macintosh v2.2 *Basic Operations* provides information about working on a mixed network.

Making a user or group trustee assignment

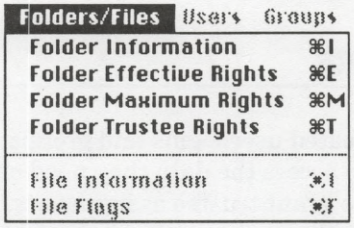
When you add a user or group as a new trustee of a folder on a NetWare v2.2 file server, the user or group is automatically given Read and File Scan rights.

Making a trustee assignment includes assigning the user or group as trustee and setting the proper group of rights to allow the trustee to perform a range of actions on the data.

To make an individual user or group as trustee of a folder, do the following:

1. **Open a list of folders by double-clicking the Volume icon in the Server window (FIGURE 6-3 on page 89).**

2. **Select a folder and choose Folder Trustee Rights in the Folders/ Files menu.**



This opens the trustee rights window:

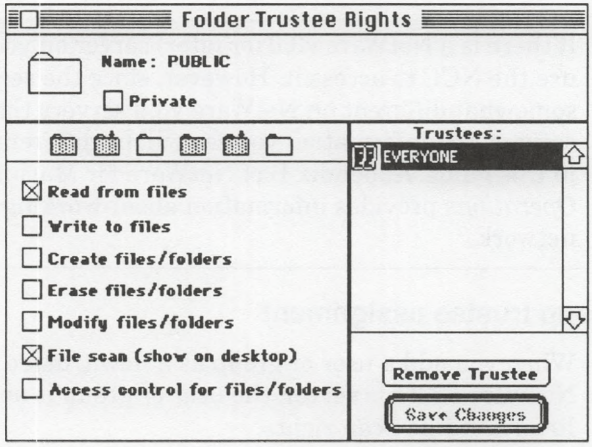


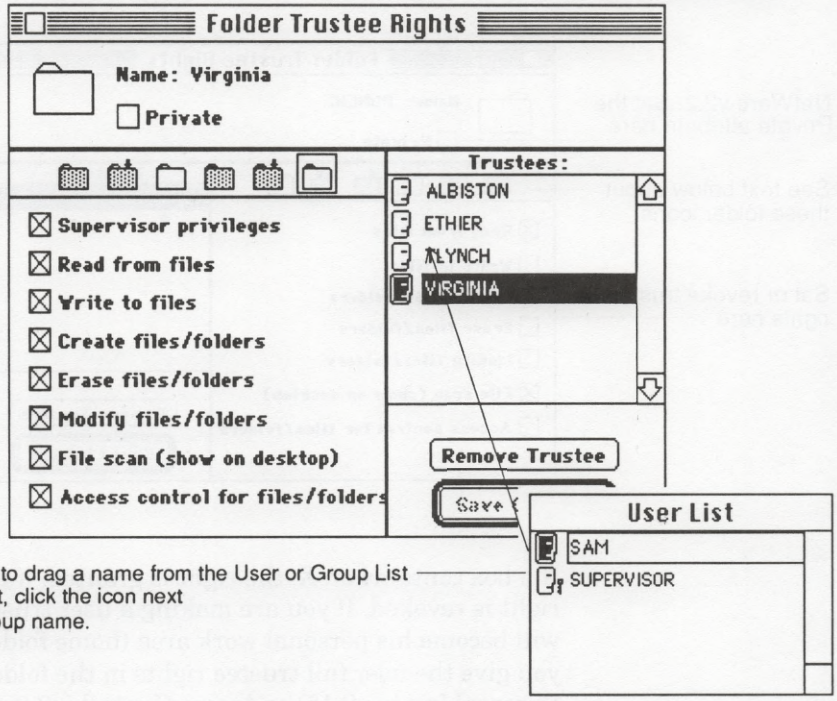
FIGURE 6-7 Trustee Rights window

3. **Open the User or Group List by double-clicking the User or Group icon in the Server window (FIGURE 6-3 on page 89).**

4. **Choose one or more names in the User List or Group List.**

   You can shift-click to select more than one name at the same time.

5. **Drag the names to the trustee list in the Trustee Rights window.**

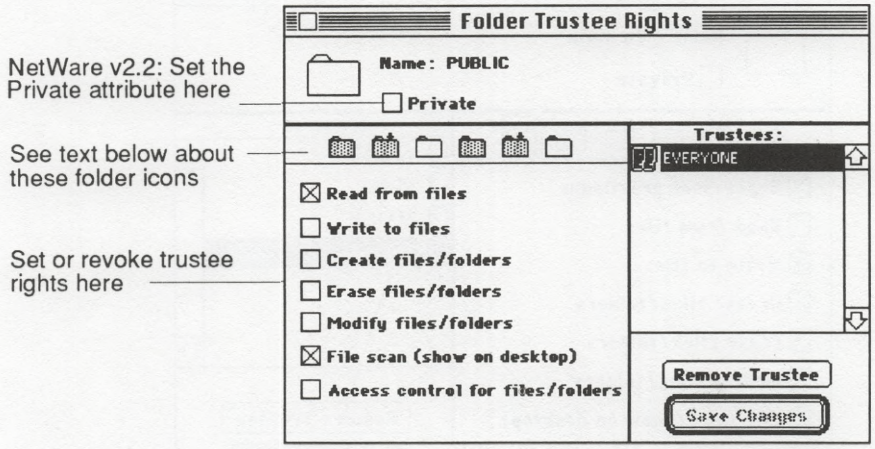


To modify trustee rights on the volume, folder, or a file under NetWare v3.0 or later for one or more trustees, do the following:

6. **Select the trustee(s) whose rights you want to modify.**

You can shift-click to select more than one name at the same time. The rights assigned to the trustee(s) you selected will be checked in the list of NetWare rights.

7. **Click the selection box for each NetWare right you want to change.**



If a box contains an X, the right is granted; if the box is empty, the right is revoked. If you are making a user trustee in a folder which will become his personal work area (home folder), make sure that you give the user full trustee rights in the folder including the Parental (up to v2.15) or Access Control (v2.2 and later) right.

8. **Click Save Changes (or press Return).**

More about the Trustee Rights window

The Trustee Rights window displays security information about a selected volume, folder, or a file under NetWare v3.0 or later.

To open the Trustee Rights window, double-click a volume icon in the Server window (or click the volume icon to select that volume), then select a folder or file on that volume and choose Folder Trustee Rights or File Trustee Rights in the Folder/Files menu.

Note that six folder icons are shown above the list of NetWare rights. These folder icons are discussed in the NetWare for Macintosh v2.2 *Basic Operations* manual and are seen by Macintosh users when they log into the server. (With NetWare v2.2, they will see the six folder icons shown below in FIGURE 6-8 ; with

NetWare v3.0 and later, they will not see the plain gray or black tab gray folders.)

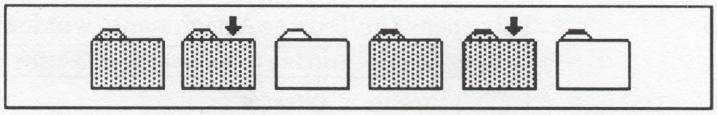


FIGURE 6-8 Close-up of NetWare v2.2 folder icons

In the NetWare Control Center, these icons can be used to set a group of NetWare rights that correspond to the functional level of security represented by the icons on a file server. For example, selecting the plain folder icon sets all NetWare rights except Access Control (a square is displayed around the folder to show it is selected). This is useful if you are not familiar with NetWare rights.

Note: Users do not need to use the NCC to modify trustee rights. Macintosh users can modify trustee rights on folders or files under NetWare v3.0 or later by using the NetWare DA Rights module. On NetWare v2.2 file servers, users must have the Access Control (or Parental, in NetWare before v2.2) right to modify security. On file servers running NetWare v3.0 and later, users must have the Supervisory right to grant all rights including the Supervisory right, or the Access Control right to grant all rights except the Supervisory right.

Another way to modify trustee rights

You can use the Trustee Rights window described above to modify trustee rights on any selected volume, folder, or file under NetWare v3.0 or later. You can also modify trustee rights by selecting a user or group and modifying trustee rights you have assigned to that user or group on a volumes, folders, or files under NetWare v3.0 or later. To change the rights you have assigned to a user or group, do the following:

1. **Open the User or Group List by double-clicking the User or Group icon in the Server window (FIGURE 6-3 on page 89).**

2. **Click a user or group name.**

3. **Choose Trustee Assignments from the Users or Groups menu.**

   This opens the Trustee Assignments window.

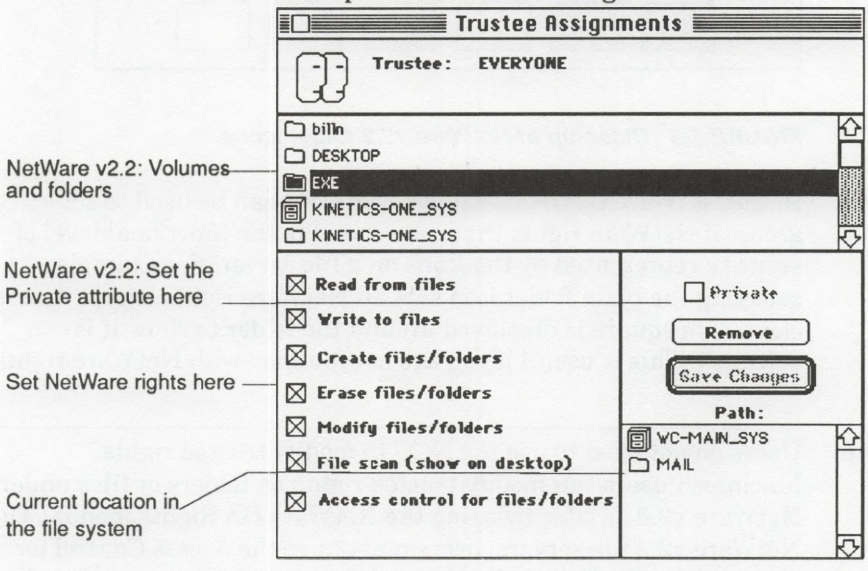


FIGURE 6-9 Trustee Assignments window

4. **Select a folder from the list at the top of the window.**

   The user or group's current trustee rights on that folder will be displayed.

5. **Click the selection box next to each right you want to change.**

6. **Click the Save Changes button (or press <Return>).**

Changing the rights mask

When a folder is created on a NetWare v2.2 file server, the folder's maximum rights mask automatically contains all eight rights. (When the folder is created from a Macintosh, the Private attribute is also set, limiting rights to the person who created it.)

To modify the maximum rights mask on a volume or folder, select the volume or folder and follow these steps:

1. **Choose Maximum Rights from the Volume or Folders menu.**

   This displays the rights mask window for the volume, folder, or file you selected.

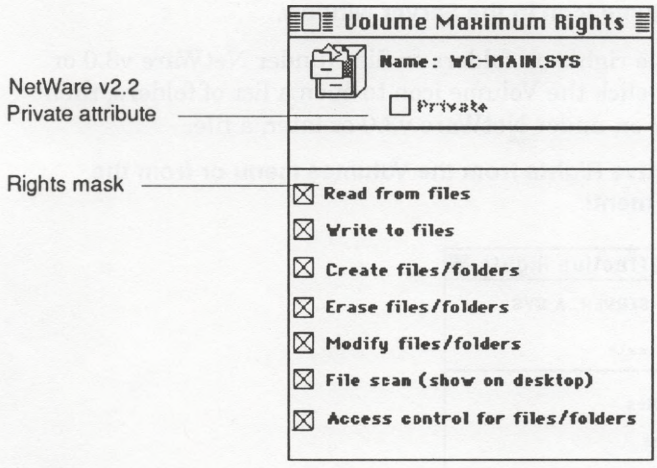


FIGURE 6-10 Volume Maximum Rights window (NetWare v2.2)

2. **Click the selection box next to each NetWare right you want to change.**

   You can also set the Private attribute by clicking the Private box at the top of the window.

Note: On a NetWare v3.0 or later file server, the procedure is the same, but you can choose Inherited Rights from the Volume, Folders, or Files menu.

Viewing a user or group's effective rights

NetWare calculates a user's effective rights by combining the user's trustee rights (using the logical "or" operation), then combining the rights mask (using the logical "and" operation) assigned to a particular folder with the combined trustee rights. In NetWare v3.0 and later, if all inherited rights are revoked, the user's effective rights are equal to his trustee assignments.

You cannot set effective rights directly, so the rights are grayed in the Effective Rights window. To view effective rights in a volume, folder, or file under NetWare v3.0 or later, do the following:

1. **Select the Volume icon in the Server window.**

   To see effective rights on folders or files (under NetWare v3.0 or later), double-click the Volume icon to open a list of folders, then select a folder or, under NetWare v3.0 or later, a file.

2. **Choose Effective Rights from the Volumes menu or from the Folders/Files menu.**

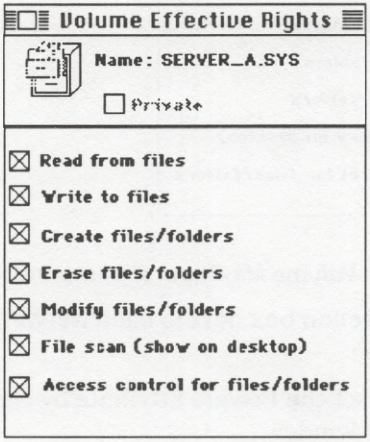


FIGURE 6-11 Effective Rights window (NetWare v2.2)

The rights that are checked show the user's effective rights.

Setting folder and file attributes

Folder and file attributes allow you to fine tune security at the folder and file level, as well as perform other functions. Attributes that are related to security override rights granted with trustee assignments.

Setting file attributes (file flags)

To set file attributes, do the following:

1. **Select a file.**

To select a file, double-click the Volume icon in the Server window, or double-click a folder to open it, and click a file that is nested within.

2. **Choose File Flags from the Files menu.**

   This opens the File Flags window:

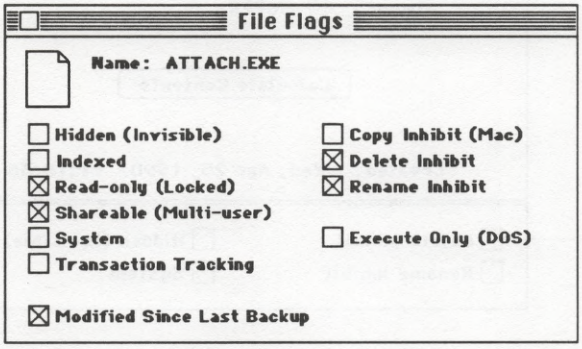


FIGURE 6-12 File Flags window

3. **Set file flags by clicking the selection box next to each flag you want to change.**

   Checking a flag makes it effective.

Note: Users need the Modify right to change file flags at the file level. In NetWare v2.2, this means a user must have the Modify right in the folder that contains the file. In NetWare v3.0 and later, this means a user must have the Modify right on the file itself.

Setting folder attributes

To set the Private attribute (NetWare up through v2.2 only), see "Making a user or group trustee assignment" on page 99 or "Changing the rights mask" on page 104. To modify other folder attributes, do the following:

1. **Select a folder.**

2. **Choose Folder Information from the Folders menu.**

This opens the Folder Information window:

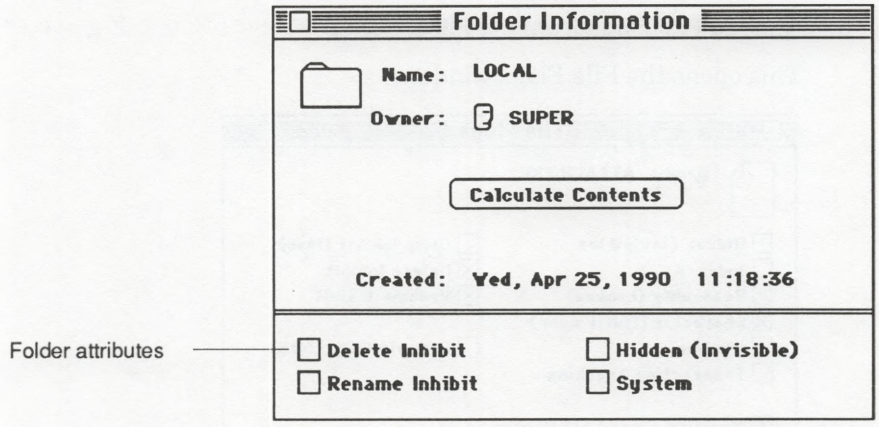


FIGURE 6-13 Folder Information window showing v3.0 attributes

At the bottom of the window you will see the attributes you can set. (In NetWare v2.2, Invisible and System are available. In NetWare v3.0 and later, Delete Inhibit, Hidden, Rename Inhibit, and System are available.)

Removing user login accounts, groups, and trustees

If one or more users no longer need to access data on a file server, you should remove their login accounts, delete them from groups they were assigned to, and remove them as trustees from any data.

In addition, you might want to add trustees for a limited time to any volume, folder, or file under NetWare v3.0 or later, providing data access only while it is required, and remove the trustees at a given date.

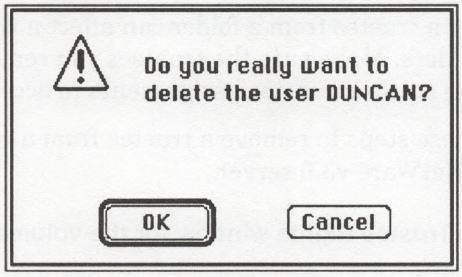
Deleting user login accounts

To delete a NetWare user login account, do the following:

1. **Open the User List by double-clicking the Users icon in the Server window (FIGURE 6-3 on page 89).**
2. **Click the name of the user(s) you want to delete.**

   Shift-click to select multiple names.
3. **Choose Delete User from the Users menu.**

   You will be asked if you really want to delete the user(s) you selected. Click OK (or press Return) and the login account(s) will be deleted.



Removing a user from a group

To remove group members:

1. **Open the Group List by double-clicking the Groups icon in the Server window.**
2. **Click a group name and open the Group Information window.**

   You can choose the Group name and select Group Information from the Groups menu, or double-click the group name.
3. **Select user name(s) in the Group Members list and click the Remove User/Group button.**

   You will be asked to confirm the deletion.

Deleting a group

To delete a group:

1. **Open the Group List by double-clicking the Groups icon in the Server window.**
2. **Click the name of the group(s) you want to delete.**

   Shift-click to select multiple names.
3. **Choose Delete Group from the Groups menu.**

   You will be asked to confirm the deletion.

Removing trustees from a volume, folder, or file (under NetWare v3.0 or later)

Removing a trustee from a folder can affect a trustee's rights in nested folders. Make sure the trustees you remove are not depending on their trustee assignments to access nested folders.

Follow these steps to remove a trustee from a volume, folder, or a file on a NetWare v3.0 server.

1. **Open the Trustee Rights window for the volume, folder, or NetWare v3.0 file.**

   To open the Trustee Rights window, double-click a volume icon in the Server window (or click the volume icon to select that volume). Then select a folder or file on that volume and choose Folder Trustee Rights or File Trustee Rights in the Folder or Files menu.
2. **Select the trustee(s) you want to remove from the trustee list.**
3. **Click the Remove Trustee button.**

   You will be asked to confirm the deletion.

Viewing volume, folder, or file information

You can use the NCC to obtain information about disk usage, folder contents and size, and file size. This section describes how the NCC displays this information.

Getting information about a volume

When a server is open, the volumes associated with the it are displayed on the right side of the Server window. To get volume information, do the following:

1. **Click the Volume icon.**

   You can select any volume on the file server, including volumes that weren't mounted when you launched the NCC. You can select multiple volumes by shift-clicking, but the volumes you select must all be on the same file server.

2. **Choose Volume Information from the Volumes menu.**

   The Volume Information window will be displayed.

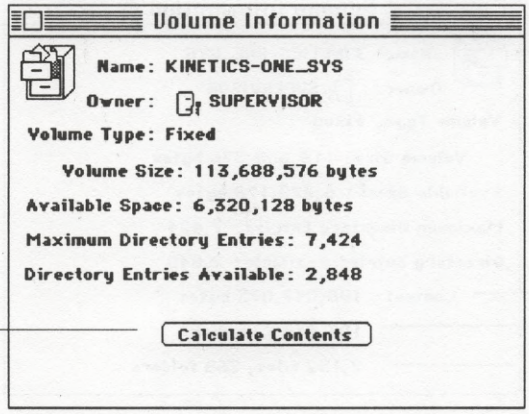


FIGURE 6-14 Volume Information window

Data displayed in this window above includes the following:

Name Volume name—if the name is SYS, it is preceded by the file server name.

Owner The user who created the volume (usually supervisor).

Volume Type Fixed (hard disk) or removable (removable medium). Since most volumes are hard disks, this will typically say "fixed."

Volume Size Volume size in bytes.

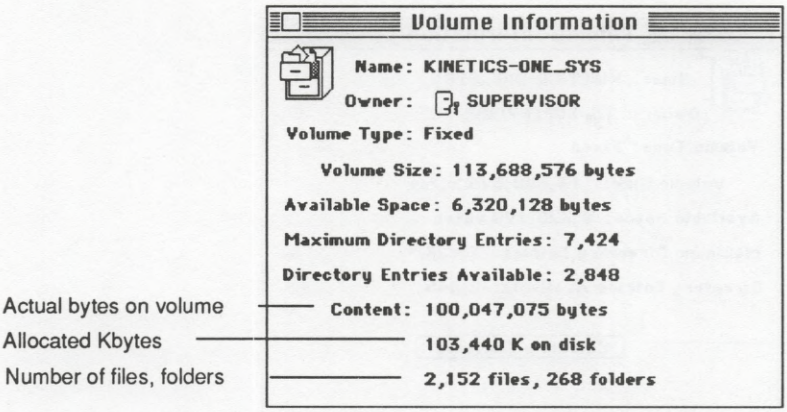
Available Space How many bytes of space are available on the volume.

Max Dir Entries The maximum number of entries that can be created for the volume. (Remember that a Macintosh file takes up two entries; one for its data fork and one for its resource fork. A DOS file only requires one entry.)

Dir Entries Available The number reported is the number of entries remaining on the volume.

Calculating volume usage

If you need specific data about volume usage, click the Calculate Contents button in the Volume Information window. (It can take a while for the system to compute the current volume usage information.)



Volume usage information includes the actual number of bytes stored on the volume, number of kbytes allocated, and the number of files and folders stored on the volume.

The allocated kbytes is space set aside of existing files to occupy. Space on the server is allocated in four kbyte blocks.

Getting information about a folder

The NCC will display size and content information about a selected folder. To view information about a folder, do the following:

1. **Select a folder.**
2. **Choose Folder Information from the Folders/Files menu.**

   This opens the Folder Information window:

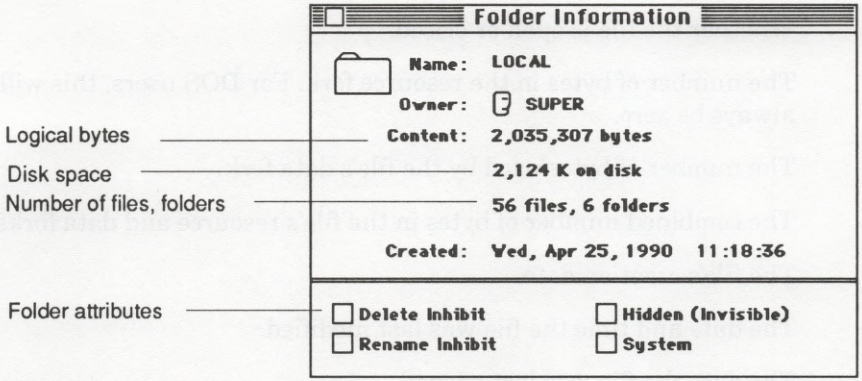


FIGURE 6-15 Folder Information window

Getting information about a file

To get information about a selected file, do the following:

1. **Select a file.**
2. **Choose File Information from the Folders/Files menu.**

   This opens the File Information window.

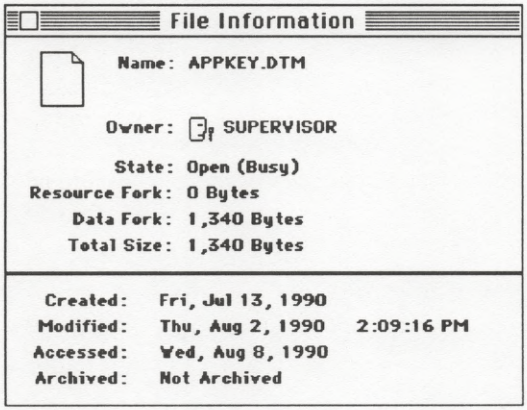


FIGURE 6-16 File Information window

The File Information window reports the following:

Name	The name of the file. Anyone with the modify right in the file can rename it.
Owner	The name of the person who created the file.
State	Whether the file is open or closed.
Resource Fork	The number of bytes in the resource fork. For DOS users, this will always be zero.
Data Fork	The number of bytes used by the file's data fork.
Total size	The combined number of bytes in the file's resource and data forks.
Created	The file's creation date.
Modified	The date and time the file was last modified.
Accessed	The date the file was last opened.
Archived	The date and time the file was last archived.

Chapter 7. AppleTalk print services

This chapter explains how to manage AppleTalk print services. For information on configuring print queues, please refer to Chapter 2. Printer installation instructions can be found in Chapter 3.

How AppleTalk print services work

AppleTalk print services consist of two parts: a spooler (or "queue server") which advertises as a LaserWriter or ImageWriter on the AppleTalk network and accepts print jobs submitted via the Chooser, and a "print server" that polls AppleTalk print queues and sends print jobs to Apple printers that were submitted by Macintosh or DOS users.

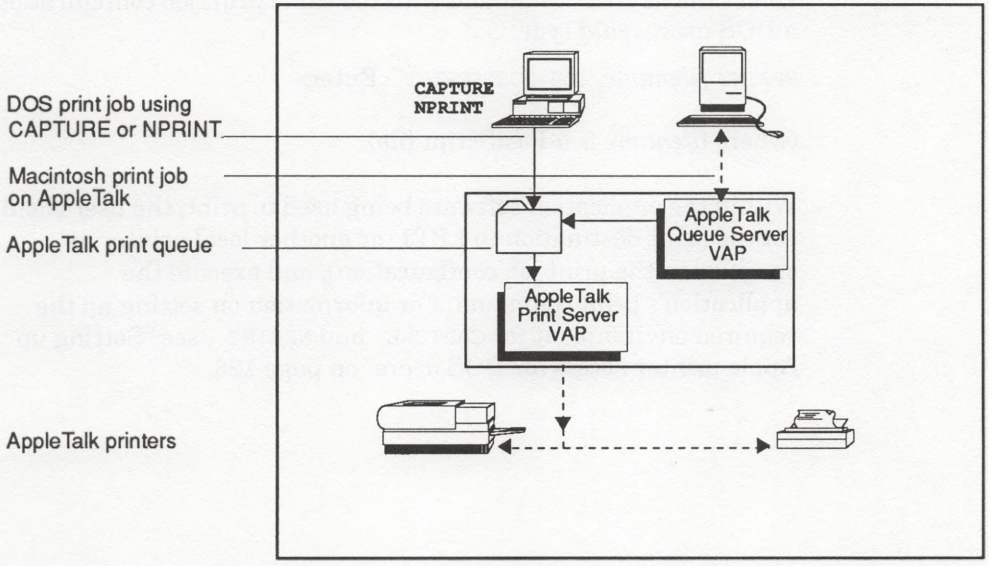


FIGURE 7-1 AppleTalk print queues

How Macintosh users print to AppleTalk queues

To the Macintosh user, sending print jobs to the AppleTalk spooler via the Chooser is exactly the same as printing directly to a LaserWriter. See Chapter 3 for user instructions.

How DOS users print to AppleTalk queues

To the DOS user, sending jobs to the AppleTalk print queue is exactly the same as printing to serial or other network printers through a NetWare queue by using the CAPTURE or the NPRINT command.

For example, to use the CAPTURE command with a print job configuration named "postscript," a DOS user would type:

```
CAPTURE/J=POSTSCRIPT <Enter>
```

(where J is an abbreviation for JOB). Depending on the contents of the print job configuration, the user might also need to type:

```
ENDCAP <Enter>
```

after printing has finished.

To use the NPRINT command with the same print job configuration, a DOS user would type:

NPRINT *filename* JOB=POSTSCRIPT <Enter>

(where *filename* is a PostScript file).

Within the application software being used to print, the user should set the print destination to LPT1 (or another local printer as specified in the print job configuration), and execute the application's print command. For information on setting up the required environment for CAPTURE and NPRINT, see "Setting up Apple printer access for DOS users" on page 126.

Managing printers and queues from the console

The console commands described in this section are for managing Apple printers and AppleTalk print queues. They should be typed at the colon (:) prompt at the file server (or bridge) console. These commands are not case sensitive, so you can type them in upper- or lowercase.

The parameters to these commands are as follows:

printer-name This is the name assigned to printer using the *Apple Namer* software. It can be up to 31 characters in length, and must be quoted if spaces appear in the name. See the *zone-name* parameter for requirements if the printer resides in a different AppleTalk zone than the file server that processes its queue(s).

zone-name The name of the AppleTalk zone in which the printer resides (if different from the zone in which the file server resides). If you use the *zone-name* parameter, you must use a colon (:) to separate it from the *printer-name*. In this case, the entire parameter must be enclosed in double-quotes if any spaces are included in the zone name or the printer name; for example, "*zone-name*:*print-name*".

printer-type The printer type can be one of the following:

`LASERWRITER`	Apple LaserWriter
`LASERPLUS`	Apple LaserWriter Plus
`LASERNT`	Apple LaserWriter NT or NTX
`IMAGEWRITER`	Apple ImageWriter
`IMAGELQ`	Apple ImageWriter Letter Quality

queue-name The name of the AppleTalk print queue. In general, this name should reflect where the queue's output will be directed. The queue name will appear in the Macintosh Chooser when the printer icon is selected. See the *server-name* parameter for

requirements if the queue is being advertised from a different file server than the server processing the queue.

server-name The name of the file server publishing the AppleTalk print queue. This will determine which zone the queue appears in the Macintosh Chooser. If you use the *server-name* parameter, you must use a slash character (/) to separate it from the *queue-name*.

Assigning a printer to service a queue

You can use the ATTACH console command to assign a printer to an existing print queue. The ATTACH command syntax is:

ATTACH *printer-name* TO *queue-name* <Enter>

The printer you assign must be of the proper type; that is, the type you assigned to the queue by using the CREATE command. Note that double-quotes are required in the command syntax if the printer name includes spaces.

If the printer is located in a different AppleTalk zone than the file server, the ATTACH command syntax is:

ATTACH *zone-name*:*printer-name* TO *queue-name* <Enter>

Creating a new AppleTalk print queue

The CREATE console command creates a new AppleTalk print queue and assigns it a printer type. All printers attached to a queue must be of the same type. The CREATE command syntax is:

CREATE *queue-name* AS TYPE *printer-type* <Enter>

The CREATE command must be used together with the PUBLISH and ATTACH commands to create a functioning print queue.

Deleting an AppleTalk print queue

The DELETE console command removes an AppleTalk print queue and detaches it from any printers that were attached. The DELETE command syntax is:

DELETE *queue-name*

Removing a printer from a queue

The DETACH command disassociates a printer from a print queue. Print jobs sent to that queue will no longer be printed on that printer. The DETACH command syntax is:

DETACH printer-name FROM *queue-name* <Enter>

If the printer is located in a different AppleTalk zone than the file server, the command syntax is:

DETACH *zone-name:printer-name* FROM *queue-name* <Enter>

Starting and stopping active printers

The STOP command temporarily removes an Apple printer from the active printer list. This takes effect immediately, interrupting a job if one is printing. The STOP command syntax is:

STOP *printer-name* <Enter>

or, if the printer resides in a different zone, use the syntax:

STOP *zone-name:printer-name* <Enter>

When you wish to return the printer to the active printer list, use the START command. (Note that a stopped print job will most likely have timed out, and will need to be sent again.) The START command syntax is:

START *printer-name* <Enter>

or, if the printer resides in a different zone:

START *zone-name:printer-name* <Enter>

Removing a printer from all print queues

This command is sometimes used in error conditions (for example, when you have entered an incorrect name for a printer), or when a single printer is connected to many queues and you wish to remove the printer from the network. The KILL command detaches a printer from all queues and removes that printer from the active printer list.

The KILL command syntax is:

KILL *printer-name* <Enter>

or, if the printer resides in a different zone:

KILL *zone-name:printer-name* <Enter>

Listing Apple printers and their queues

The PLIST command lists the printers on the network and the queues serviced by each of them. The PLIST command syntax is:

PLIST <Enter>

To list the queues associated with one printer, use the syntax:

PLIST *printer-name* <Enter>

or, if the printer resides in a different zone:

PLIST *zone-name:printer-name* <Enter>

Using shared fonts on a PostScript printer

The QUERY command creates a list of fonts supported by a PostScript printer. The file server will create a font file in the SYSTEM area that lists the fonts supported on the printer's hard disk, and you should see a message indicating that the font file was successfully created.

When a user sends a print job, the AppleTalk print server VAP refers to this list to detect whether the printer supports the fonts required by the job. If it does not find this file, or if the file does not

contain the required fonts, the VAP sends the Macintosh system a list of the fonts built-in to the printer's ROM. If the print job uses additional fonts, the workstation downloads the additional fonts it needs. If the workstation cannot send a laser font description, the printer will attempt to create a bitmap approximation of the font, or the user will see an error message.

The QUERY command creates only one font file per print queue. It is much more reliable when that queue has only a single printer attached to it. However, the QUERY command will work with more than one printer attached to a queue, provided that all of the printers support exactly the same set of fonts.

The QUERY console command is required when fonts have been downloaded to a printer. After downloading the fonts, type the command:

QUERY *printer-name* <Enter>

or, if the printer resides in a different zone:

QUERY *zone-name:printer-name* <Enter>

Note: Using the QUERY command with fonts that have been downloaded to a printer's RAM is not recommended, because this requires re-entering the QUERY command whenever the printer is powered down. This command is intended for use with "shared fonts," which have been downloaded to a hard disk connected to the printer.

Setting up shared fonts on a hard disk

After connecting an external hard disk to the LaserWriter IINTX, you need to initialize the disk by using the *LaserWriter IINT/NTX Installation Disk* and download fonts to it by using the LaserWriter Font Utility on the same installation diskette. When you download the fonts, choose to download to disk rather than RAM. The fonts will be stored on disk until you remove them.

Every time you download new fonts or create a new queue, you need to re-issue the QUERY command.

For example, suppose you create a queue named MY_QUEUE and attach it to a LaserWriter IINTX named" Admin NTX," which has an initialized hard disk connected to its SCSI port.

1. **Use the LaserWriter Font Utility to download a set of fonts to the hard disk.**
2. **Go to the console and type:**

```
QUERY "Admin NTX" <Enter>
```

The file server will create a font file that lists the fonts supported on the printer's hard disk, and you should see a message indicating that the font file was successfully created. All the printer's fonts will be available to all users who access the printer through its NetWare queue.

Note: If additional fonts are downloaded to the printer, or if you remove any fonts from the printer's hard disk, remember that you must run QUERY again.

Listing AppleTalk queues

The QLIST console command lists all AppleTalk queues servicing the network and the printer types associated with them. The QLIST command syntax is:

QLIST <Enter>

Advertising a queue as a printer on the AppleTalk network

The PUBLISH command causes a queue to advertise as a service (an ImageWriter or LaserWriter) on the AppleTalk network. When a queue is published, it appears in the Macintosh Chooser when a user selects a zone name (if applicable) and the printer's icon. If a queue is not published, it is not accessible to Macintosh users.

The PUBLISH command syntax is:

PUBLISH *queue-name* <Enter>

You can use PUBLISH to advertise a queue that resides on another file server by using a slash character (/) to separate the file server name from the queue name:

PUBLISH *server-name/queue-name* <Enter>

Stopping a queue from advertising on the AppleTalk network

If you need to temporarily prevent Macintosh users from accessing a queue, you can use the UNPUBLISH command to stop it from being advertised as a service on the AppleTalk network. This has the effect of temporarily removing the queue, because users will not be able to access it. To restore an unpublished queue, simply issue the PUBLISH command.

The UNPUBLISH command syntax is:

UNPUBLISH *queue-name* <Enter>

You can use UNPUBLISH to stop advertising a queue that resides on another file server by using a slash character (/) to separate the file server name from the queue name:

UNPUBLISH *server-name/queue-name* <Enter>

Viewing and modifying print queues from a Macintosh

Unless you designate Macintosh users as print queue operators, they cannot modify NetWare print queues (for example, deleting jobs or postponing them) from the Macintosh workstation.

Users who are not print queue operators can only view the queue. Print queue operators can modify any job in the queue.

To designate a Macintosh user as a print queue operator, go to a DOS client and use the PCONSOLE utility. Please refer to *NetWare Supervisor Reference* for instructions on PCONSOLE.

Viewing the print queue

To view a print queue from the Macintosh, log in to a file server and follow the steps below.

1. **Select NetWare from the Apple (🍎) menu.**
2. **Click the Print Queue icon at the left side of the window.**

   This brings up the print queue window.
3. **Select a server and a print queue from the pop-up menus at the bottom of the window.**

   The print queue you selected will be displayed in the print queue window.

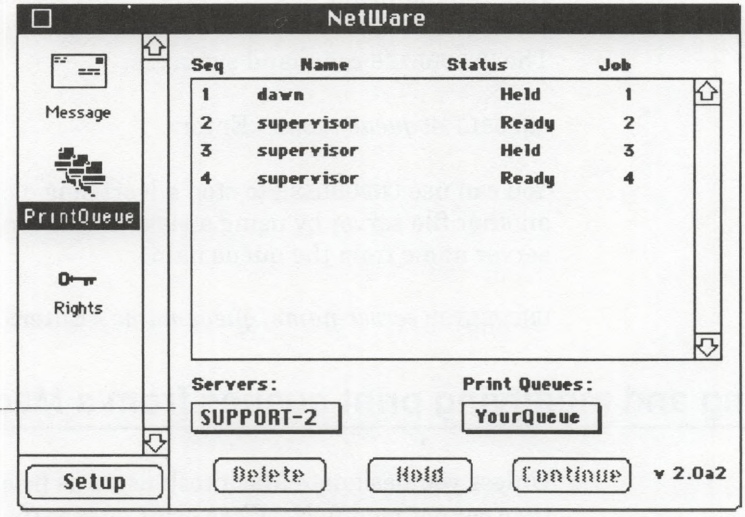
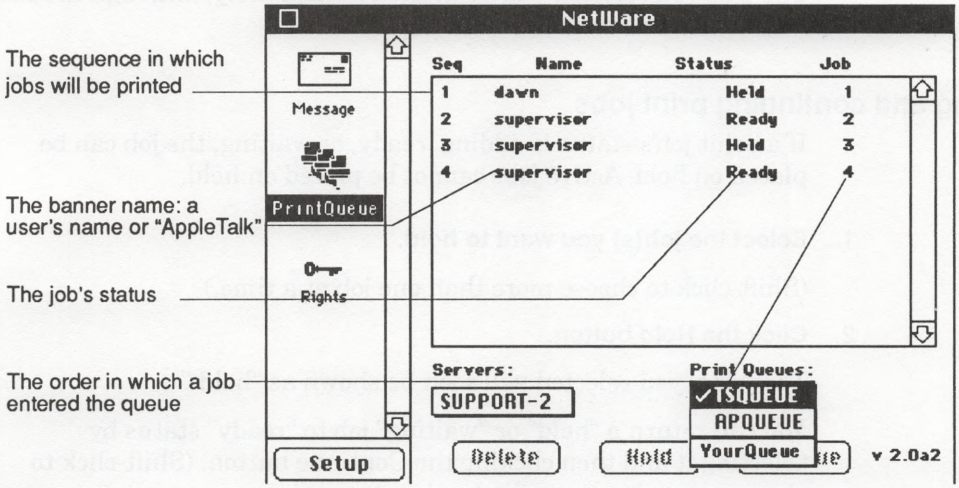


FIGURE 7-2 The print queue window

The popup menus, labeled "Servers:" and "Print Queues:", are located below the main data list. The three buttons at the bottom of the screen are dimmed unless the user is a Print Queue Operator and until the operator has selected a job in the queue.

The print queue data list contains four columns labeled SEQ (sequence), NAME, STATUS, and JOB.



A print job's status can be one of the following:

Adding	The job is currently being added to the queue.
Ready	The job is ready to be sent to the printer.
Waiting	The job has been flagged to be printed at a future time.
Held	The job has been flagged to wait indefinitely until it is continued or deleted.
Active	The job is being sent to the printer.

The job order column will reflect any modifications made by print queue operators or the supervisor; for example, if Job #119 is moved up in the queue, it retains the number 119 but appears before Job #117.

Deleting a job from the queue

Any print job can be deleted from the queue, regardless of status.

1. **Select the job(s) you want to delete.**

   (Shift-click to choose more than one job at a time.)

2. **Click the Delete button.**

   The jobs you selected will be deleted immediately, although the list may take a few seconds to update.

Postponing and continuing print jobs

If a print job's status is adding, ready, or waiting, the job can be placed on hold. Active jobs cannot be placed on hold.

1. **Select the job(s) you want to hold.**

   (Shift-click to choose more than one job at a time.)

2. **Click the Hold button.**

   The job(s) you selected will soon be shown as "held."

   You can return a "held" or "waiting" job to "ready" status by selecting it and then clicking the Continue button. (Shift-click to choose more than one job at a time.)

Changing the order of a queue

You can change the order of jobs that have adding, ready, or waiting status. (It is possible to move a job ahead of an active job in the print queue window. However, that job will not be printed until the active job is printed or deleted.)

You can only change the order of one job at a time.

1. **Select the job you want to reorder.**
2. **While holding down the mouse button, drag the job to its new position in the queue.**

   After a few moments, the queue print sequence order will be updated (the "SEQ" column).

Setting up Apple printer access for DOS users

DOS users can print to Apple printers by using the CAPTURE and NPRINT commands. These NetWare commands use print information stored in two databases on the server. This print

information is accessed dynamically and provided as a header to the print job when it is sent to the NetWare queue. The two databases are:

NET$PRN.DAT	Contains printer definitions (.PDF files that must be imported to the database by using the PRINTDEF command). It also contains at least one "print form." This database is located below the SYSTEM area.
PRINTCON.DAT	Contains print job configurations for an individual user. Print job configurations are created by using the PRINTCON command. This database is located in the individual MAIL directory for each user.

Both the CAPTURE and NPRINT commands require the information stored in these databases to use as header information required by the Apple printers. You need to add Apple printer information to these databases by using the PRINTDEF and PRINTCON commands.

Modifying the DOS shell configuration file

When the DOS client boots up, it reads a NetWare configuration file named SHELL.CFG (which must be located in the same directory that contains the network software NET*x*.COM). It uses the information there to provide memory for header information required by the CAPTURE command.

If you plan to use the CAPTURE command with a LaserWriter printer in Diablo 630 mode, you must add the following line to the SHELL.CFG file of each workstation from which the command will be issued:

```
PRINT HEADER = 255
```

If the workstation does not have a SHELL.CFG file, you must create one in the directory that contains the NET*x*.COM file. Please refer to *Installing and Maintaining the Network* for DOS client issues.

Importing Apple printer definitions

To print to both types of Apple printer (both LaserWriters and ImageWriters) you need to import the printer definitions. These printer definitions are ".PDF" files that replace the older versions that might already exist in the \PUBLIC area on a file server. (The print definitions were

To import these definitions, log in as supervisor (or go to the console) and type `PRINTDEF` at the command line. Then choose Print Devices and press <Enter>.

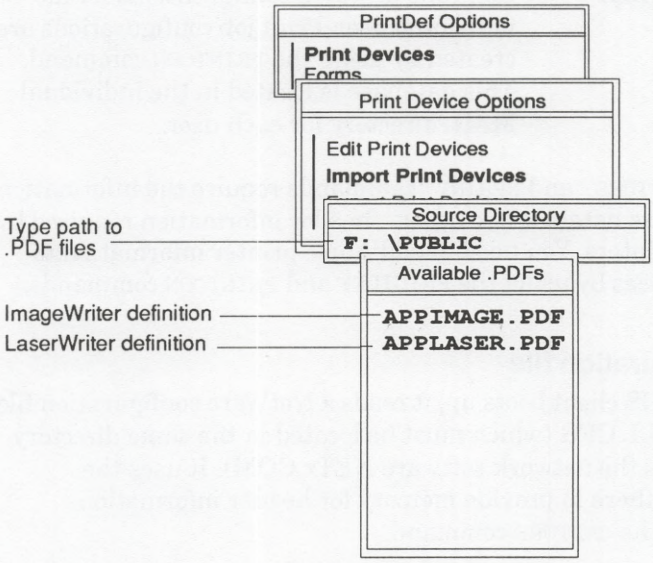


FIGURE 7-3 Importing print device definitions

After you choose Import Print Devices and press <Enter>, you will be prompted for the PDF source directory. Type F: \PUBLIC This opens a list of .PDF files, which includes APPIMAGE.PDF (for the ImageWriter) and APPLASER.PDF (the LaserWriter). These files were copied into the server's \PUBLIC area from the PRINT-2 diskette when you installed the NetWare operating system.

Import the Apple printer definitions by selecting each name, APPIMAGE.PDF and APPLASER.PDF, and pressing <Enter>.

To exit PRINTDEF, press <Esc> to back out of the menus or <F10> to exit immediately.

Defining the Normal print form

If you have already created a form called Normal that defines 8X11 sheets of paper, you do not need to create special forms for the Apple printers. The only requirement is that at least one print form exists.

If you need to create the Normal print form, type PRINTDEF at the console command line and choose Forms in the first menu.

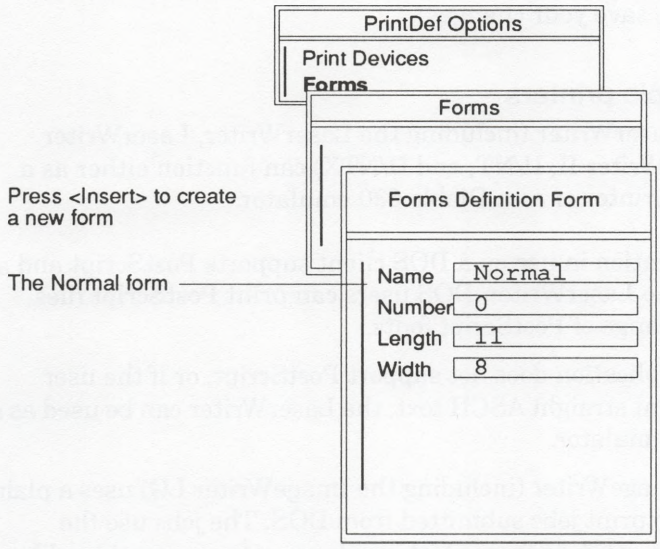


FIGURE 7-4 Creating print forms with PRINTDEF

Press <Insert> to bring up the Forms Definition Form and enter the following values:

Normal — The Normal form will apply to all Apple printers. If you prefer to use a different name for this form, remember that the first character of the name must be alphabetic, and the form name cannot exceed 12

characters. Use an underscore (_) instead of a space between words in a form name; for example: White_8x11.

0 — If no other forms exist on this server, the default number will be 0. Leave this as is, or type another number less than or equal to 255.

11 — This specifies the length of an 8-1/2 by 11 inch sheet of paper.

8 — The printable width of an 8-1/2 by 11 inch sheet of paper.

Press <Esc> to exit the Forms Definition Form. You will be prompted to save your changes.

Print job configurations for Apple printers

An Apple LaserWriter (including the LaserWriter, LaserWriter Plus, LaserWriter II, II/NT, and II/NTX) can function either as a PostScript printer or as a Diablo 630 emulator.

If the application in use on a DOS client supports PostScript and a driver for the LaserWriter, DOS users can print PostScript files with a full range of PostScript fonts.

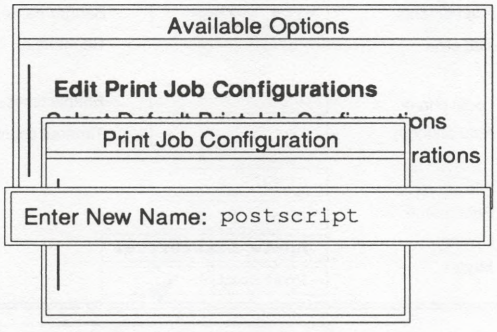
If a DOS application does not support PostScript, or if the user wants to print straight ASCII text, the LaserWriter can be used as a Diablo 630 emulator.

An Apple ImageWriter (including the ImageWriter LQ) uses a plain text mode to print jobs submitted from DOS. The jobs use the ImageWriter resident font, which produces output something like a line printer.

Print job configurations are associated with individual users. They are stored in the PRINTCON.DAT database located in the individual MAIL directory for each user. Individual users can use `PRINTCON` to modify the job configuration you install for them; for example, to include a banner page with their user name, print to a different print queue, and so forth.

Apple LaserWriters in PostScript mode

To create a print job configuration for LaserWriters in PostScript mode, log in as supervisor from a DOS client and type PRINTCON at the command line. Then select Edit Print Job Configurations and press <Enter>. This brings up a list of available configurations.



To create a new print job configuration, press <Insert>. This brings up a dialog box in which you can enter a name for the new configuration.

You should always name the job configuration so that it is easily identifiable; for example, for a LaserWriter in PostScript mode,

```
postscript
```

After you name a new print job configuration, the main dialog box comes up, where you can enter all the values pertinent to the

LaserWriter in PostScript mode. FIGURE 7-5 shows the values you need to know about.

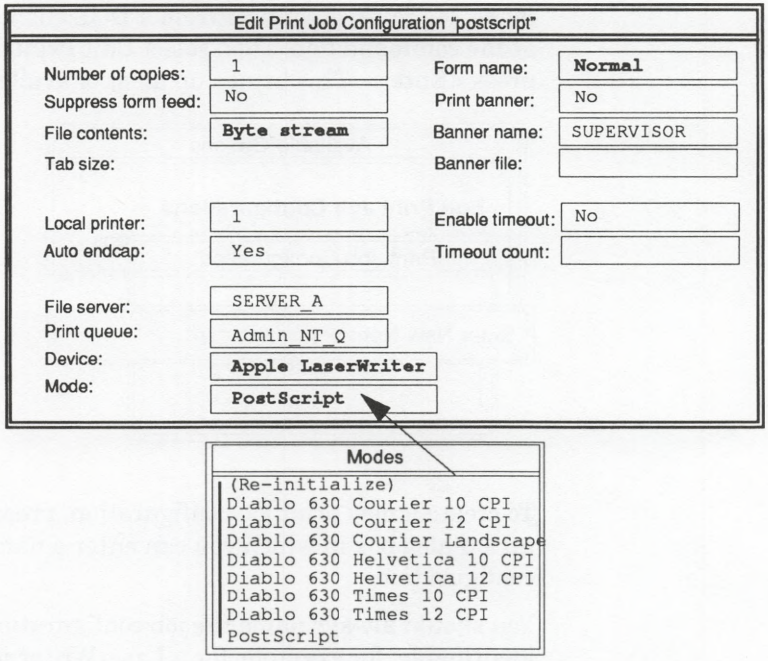


FIGURE 7-5 Creating a PostScript job configuration

Number of copies This defaults to 1; it can be increased for print jobs that will routinely require multiple copies.

Suppress form feed This should always be set to No (the default) for AppleTalk print services.

File contents This defaults to Text; press <Enter> and choose Byte Stream. Features associated with text printing, such as tab expansion, margin sizes, and so forth, are not supported by AppleTalk print services. (Note that the Tab Size field in inactive when you select Byte Stream.)

Local printer This defaults to 1, for LPT1. This has no effect on the network printer, but is used with the `CAPTURE` command to reroute command line print directions such as "`dir > lpt1`" to the queue associated with this configuration.

Auto endcap — If this is set to Yes, the CAPTURE command quits after a print job is sent.

File server — This defaults to the server you are logged in to, but you can press <Enter> to log in to another file server. This must be the file server that runs the queue used by this configuration (specified in the next field).

Print queue — Press <Enter> to display a list of queues on the current file server. When the user submits a job to the queue you name here, this (current) print job configuration will be used. The type of this queue must be compatible with the Device (named in the next field).

Device — Press <Enter> to bring up the Device menu, and choose Apple LaserWriter.

Mode — Press <Enter> to bring up the Modes menu, and choose PostScript. The Modes menus for all NetWare for Macintosh print job configurations are related to the .PDF files you imported from the *GATEWAY* diskette. If the Modes menu does not appear when you press <Enter>, make sure you have followed the instructions in "Importing Apple printer definitions" on page 128.

Form name — If there is only one form defined in this file server, its name will appear here (e.g., "Normal"). Use the Normal form unless you have a reason to define special forms. See "Defining the Normal print form" on page 129.

Print banner — No banner will be printed if this is set to No.

Banner name — The default banner name is your login name (supervisor). If you need to print banner pages on print jobs, you need to explicitly change this field after copying the print job configuration for other users.

Banner file — If you need a customized banner page, you can indicate here.

Enable timeout — If this is set to Yes, NetWare will assume a print job is finished if it hasn't received anything for the specified number of seconds.

Timeout count — The number of seconds if timeout is enabled.

Apple LaserWriters in Diablo 630 emulation mode

To create a print job configuration for LaserWriters in Diablo 630 mode, log in as supervisor from a DOS client and type PRINTCON at the command line. Then select Edit Print Job Configurations and press <Enter>. This brings up a list of available configurations.

To create a new print job configuration, press <Insert>. This brings up a dialog box in which you can enter a name for the new configuration. You should always name the job configuration so that it is easily identifiable; for example, for a LaserWriter in Diablo 630 mode,

```
courier_10
```

After you name a new print job configuration, the main dialog box comes up, where you can enter all the values pertinent to the LaserWriter in Diablo 630 emulation mode.

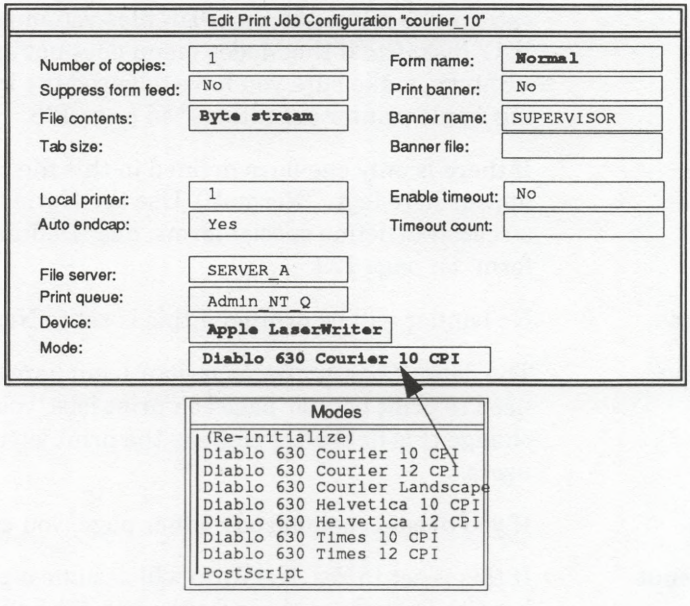


FIGURE 7-6 Creating a Diablo 630 emulator job configuration

Note that the only field that needs to change from the previous example (FIGURE 7-5 on page 132) is the Mode. The "CPI" notation (characters per inch) is based on the Diablo 630 specification. As the

number of characters per inch increases, the size of individual characters decreases. If you wish to increase the size of characters on Diablo 630 emulation output, you should decrease the CPI value.

Apple LaserWriters in Postscript Binary Graphics mode

If you are planning to printPostScript files containing binary characters (that are not control characters) from a DOS workstation to a LaserWriter printer via the NetWare for Macintosh print queues using NPRINT or CAPTURE, then you will need to select the "PostScript Binary Graphics" mode when you create a print job configuration in PRINTCON. (See the previous section, "Apple LaserWriters in Diablo 630 emulation mode" for an example of how to select a print mode.)

You should note that Encapsulated PostScript files (EPSF) generated from Macintosh-based applications often include binary data. *Adobe Illustrator* is an example of an application that can generate EPSF formatted files.

See "Printer sends multiple error pages, treats single files as multiple files" on page 142 for a description of some of the symptoms of selecting the wrong print mode for binary files.

Apple ImageWriters

To create a print job configuration for Apple ImageWriters, log in as supervisor from a DOS client and type PRINTCON at the command line. Then select Edit Print Job Configurations and press <Enter>. This brings up a list of available configurations.

To create a new print job configuration, press <Insert>. This brings up a dialog box in which you can enter a name for the new configuration.

You should always name the job configuration so that it is easily identifiable; for example, for an ImageWriter,

```
imagewriter
```

After you name a new print job configuration, the main dialog box comes up, where you can enter all the values pertinent to the ImageWriter or ImageWriter LQ printers.

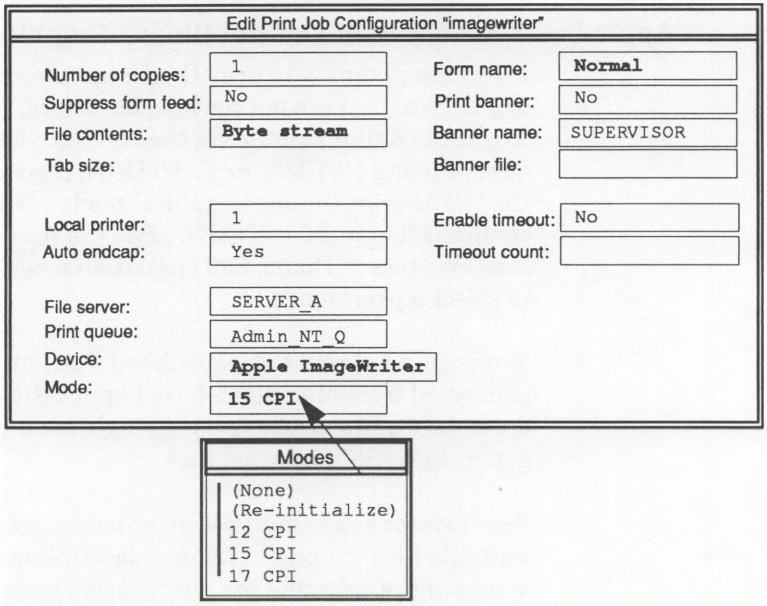


FIGURE 7-7 Creating an ImageWriter job configuration

Note that the fields that need to change from the previous example include the queue name, the Device, and the Mode. Like the LaserWriter in Diablo 630 mode, the ImageWriter configuration uses the "CPI" notation (characters per inch). Note that as the number of characters per inch increases, the size of individual characters decreases. If you wish to increase the size of characters on ImageWriter output, you should decrease the CPI value.

Remember that the queue you specify must be of type ImageWriter.

Copying print job configurations to other users' MAIL directories

When you have created a print job configuration, you can use PRINTCON to copy it to other DOS users by following the steps below.

1. **Press <Escape> to return to the initial PRINTCON menu.**

2. **Choose Supervisor—Copy Print Job Configurations (<Enter>).**

   This brings up a dialog box labeled "Source User."

3. **Type the name of the user whose print job configuration file you want to copy; for example, supervisor (<Enter>).**

   This brings up a dialog box labeled "Target User."

4. **Type the name of the user to whom you are copying the print job configuration file (<Enter>).**

   Repeat this process for each user who needs a copy of the configuration file, then exit PRINTCON by pressing <Escape>.

   If you need to modify fields for an individual user, you need to log in as the that user and invoke PRINTCON to modify the configuration. Alternatively, individual users can modify their own print job configurations to include banner pages with their user name, choose a new print queue, and so forth.

Chapter 8. Troubleshooting

This chapter lists some common error conditions, system messages, and error codes that can be generated while the NetWare for Macintosh software is running.

Calling for help

If your attempt to resolve the problem fails and you purchased NetWare for Macintosh from an authorized dealer, please call your dealer for assistance. You should be prepared to give a complete description of the problem, including what happens, when it happens, and what you've done to diagnose the problem. You should also have information about your network configuration on hand.

General error conditions

This section describes some common error conditions that can occur when Macintosh users access file servers or when Macintosh and DOS users access AppleTalk print services.

AppleShare icon does not appear in the Chooser

Check that the AppleShare Workstation software has been installed on the Macintosh client. Please see "Checking and installing the workstation software" on page 75 for instructions.

File server name appears dimmed in the Chooser

On a NetWare v2.2 file server, this can occur when the Private attribute is set in Volume Information. Please see "Getting information about a volume" on page 111 for instructions on turning off the Private attribute using the NetWare Control Center.

On a server running NetWare v3.0 or later, this can occur when the Mac name space has not been installed on a volume under NetWare v3.0 or later. Please see the *Installation* manual for NetWare v3.0 or later for details on installing the Mac name space.

File server name does not appear in the Chooser

Check that the file server is up and running, that the cables are all connected properly, and that the right zone is selected. If everything is correct, reboot the file server and load the VAPs. Then verify that the VAPs were loaded by using the VAP console command.

Device names appear and disappear in the Chooser

This can occur when there is an AppleTalk naming conflict caused by an improper configuration of multiple targets and hosts. Please see "Configuring VAP hosts and target file servers" on page 163 and "Remote print queues on target servers" on page 167 for details on reconfiguring the VAP host with aliases.

This problem can also occur when there are more device names than the Chooser can hold. The Chooser has a built-in limitation on the number of devices that can be visible; the exact limitation depends on the number of characters in each device name.

If device names in the Chooser frequently disappear, then reappear, first check the NetWare for Macintosh service configurations and make sure there are no AppleTalk naming conflicts. If everything is correct in the configuration, you can either divide the AppleTalk network into zones containing fewer services (LaserWriters or file servers) or reduce the number of characters in some or all of the device names.

Macintosh users cannot access a file server volume

This is likely to be a security rights problem. If there are DOS clients on the network, first check whether DOS users can access the volume. If the volume is accessible to DOS users but not Macintosh users, check the NetWare rights on the hidden DESKTOP directory at the top of the volume.

Macintosh users must have Read, Open, and Write [ROW] rights on the DESKTOP directory. These are automatically set for the group EVERYONE during the Desktop installation procedure in MACSETUP. Check not only these rights on the file server but also the group membership of those users who cannot log in.

Macintosh users have unpredictable results with folders and files, or performance is noticeably slow

Any of the following symptoms with icons, folders and files, or application files can indicate problems with the files contained in the DESKTOP directory on the file server:

1) You begin seeing "generic" icons instead of proper DOS or Macintosh icons.
2) Desktop performance is greatly slowed. For example, it takes up to a second to list each item in a folder when you View by Name. This can occur on a local disk, not just the server.
3) When you double-click an application, youreceive a message stating that the application cannot be found.

The DESKTOP directory is a hidden directory created at the root of each volume during NetWare installation. DESKTOP contains four files that are used to build the desktop:

iconkey.dtm

icondata.dtm

appkey.dtm

comkey.dtm

Very occasionally these files can become corrupted, in which case you need to reinstall and rebuild the DESKTOP on the file server.

Before reinstalling and rebuilding the DESKTOP, make sure that your server is running Version 2.0 of the AppleTalk Filing Protocol Gateway (AFPSPG.VAP). Slow performance can also be caused by running the wrong version of this VAP. Please see "Verifying that the VAPs were correctly installed" on page 35 for instructions on checking the Version number of the VAPs. If the wrong version of this VAP is installed, you need to rerun MACSETUP. Please see "The network topology we have provided is a simplified one that shows a NetWare server running file and print services, and a target server. In this example, NetWare for Macintosh is installed on SERVER_A, and SERVER_B is configured as a target file server." on page 40.

Printer sends multiple error pages, treats single files as multiple files

Failure to select the PostScript Binary Graphics mode when printing binary files from a DOS workstation via the NetWare for Macintosh print queues (using NPRINT or CAPTURE) can cause the following problem:

- The file may be broken into several (or dozens) of sections with an error message printed for each section. This is because certain characters ($04 and $1A) are erroneously interpreted as end-of-file sequences.

See "Apple LaserWriters in Postscript Binary Graphics mode" on page 135 for a description of how to select the PostScript Binary Graphics mode.

Printer modes menu does not appear in PRINTCON

This usually means that the correct printer definition files for Apple LaserWriters and ImageWriters are not found in the NET$PRN.DAT database. Please see "Importing Apple printer definitions" on page 128.

You can't attach a printer to a queue

To see whether an AppleTalk printer is attached to a queue, use the PLIST command at the console. This command produces a list of printers and the queues they service. Please see "Listing Apple printers and their queues" on page 120 for details.

If a printer will not attach to a queue, one of the following may be wrong:

1) Check that you did not mistype the printer name or queue name when you tried to attach the printer using the ATTACH console command. The printer's name must be typed exactly as it is in the Chooser.

If you entered the wrong printer name, use the KILL command and specify the incorrect printer name. Then ATTACH the printer using the right name.

If you entered the wrong queue name, use the DETACH command, then ATTACH with the proper queue name.

2) Check that the printer is in the same AppleTalk zone as the file server, or that you entered the printer's zone correctly on the ATTACH command line.

If you entered the wrong zone name (or did not specify any zone name when one was required), use the DETACH command. Then ATTACH the printer again with the proper zone name.

Note: The printer you are attaching must be compatible with the ImageWriter or LaserWriter family of printers. Some printers that are marketed as "100% compatible" do not actually operate at a high enough voltage to transmit data on a network.

Note that NetWare's QUEUES command lists only printers connected directly to a file server's serial and parallel ports and does not list AppleTalk printers. Therefore, a queue that only serves AppleTalk printers will not show any printers through the QUEUES command.

Print job appears to be accepted by a queue but does not print

Check that you have a printer attached to the queue and that printer is turned on. Please see "Listing AppleTalk queues" on page 122 for instructions on checking the queue.

Check the amount of space left on the volume. As a rule of thumb, a print queue requires about one megabyte of free disk space to store files.

A print queue is no different than any other folder on the server; each incoming print job is a separate file that is kept in the print queue folder until it prints. If users have heavy print demands and will be submitting lots of large print jobs, you will need to increase the amount of free space available on the server to accommodate usage.

Users see a PostScript error or only a banner page prints

This can occur when a user submits a print job to the queue and the printer does not have a font, even though the font list built by the QUERY command indicates that it does. Please see "Using shared fonts on a PostScript printer" on page 120 for instructions on downloading fonts and using QUERY.

File is printed with a bit-mapped version of some fonts

If the printer has a font, but it is not contained in the font list built by QUERY, the print job will most likely be printed with a bit-mapped version of the font. You can fix this by running the QUERY command at the console. Please see "Using shared fonts on a PostScript printer" on page 120 for instructions on downloading fonts and using QUERY.

Reinstalling the Desktop on a file server

After you have verified that the file server is running the correct version of the VAPs, follow these steps to rebuild the Desktop:

1. **Make sure all Macintosh users are logged off the network.**
2. **From a DOS client, log in as supervisor and run MACSETUP.**
3. **From MACSETUP's main menu select "Install/Configure File Services."**

   This opens the File Service Options menu.

4. **Select "Prepare a Target Server" from the "File Services Options" menu.**

5. **Select the file server on which the problems are occurring, and press <Enter>.**

   A message appears prompting you to insert the GATEWAY diskette.

6. **Insert the GATEWAY diskette into drive A and press <Enter>.**

   A message will appear, stating that the DESKTOP directory already exists.

7. **Press enter to overwrite the existing DESKTOP directory, then press <Esc> to exit MACSETUP.**

Rebuilding the Desktop on the file server

1. After you have reinstalled the DESKTOP on the file server, you should rebuild it from a Macintosh client. To do so, follow these steps:

1. **Log in as supervisor from a Macintosh client.**

2. **Hold down the Command-Option keys while the volume is being mounted.**

   You need to press the Command-Option keys down while you click OK in the Chooser to select a volume and continue to hold the keys down until the volume is mounted.

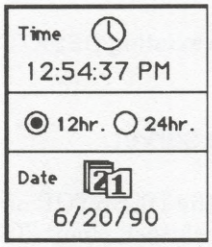
3. **A dialog box will appear asking to confirm that you want to rebuild the desktop. Click OK.**

Note: Note that, when you rebuild the desktop, you will lose any information you've added in the Comments field of each file or Folder's Get Info window.

If an error dialog appears saying that there is not enough Finder memory, reboot the Macintosh running Finder instead of Multifinder and repeat steps 1 through 3.

File creation and modification dates are wrong on files copied to the file server

If Macintosh users report that they are losing "Last Modified" and "Created" information when they copy their local Macintosh folders and files to the NetWare file server, check the system clock on the Macintosh and make sure it is synchronized with the system clock on the file server. To do this, open the Control Panel and check the "General" icon to see that the system clock displays the correct time.



If the Macintosh system clock is correct, check the time on the file server and if necessary reset it.

Macintosh VAPs fail to load on a newly-configured router or server

If you see an error message that reports a router or server does not have enough memory to run the Macintosh VAPs, even though the computer has at least 4Mbytes of memory, then you should check the following:

- If you are running a dedicated router or server, we suggest you delete any AUTOEXEC.BAT or CONFIG.SYS files which might be on the computer. If you do not wish to delete these files, you should check it to make sure that they do not automatically load programs that will take up the computer's memory and thus cause memory problems when you run the router or server and try to load the VAPs.

Another reason for the Macintosh VAPs failing to load is:

- If you're setting up a non-dedicated router or server (a computer which is functioning both as a DOS workstation and a router or server), make sure DOS CONFIG.SYS file does not contain the command BREAK= ON. Leaving the BREAK command set to ON could prevent your router or server from initializing correctly or prevent the VAPs from loading successfully.

Macintosh VAPs are not loaded at system reboot

VAPs are loaded using calls to the operating system that are similar to login processes from client workstations. When the file server or bridge is located on a very extensive local area network, it can be overloaded with initialization calls at boot time and time ou the VAP installation.

The following error messages are symptomatic of this problem:

```
ABEND: Out of IPX sockets.

ABEND: VAP failed to log in.

AQSVAP: Login failure.
```

To fix this situation, reboot the system. When you see the prompt:

```
Do you want to load the VAPs?
```

wait approximately 45 seconds before typing "Y" and pressing <Enter>. This gives the file server or bridge sufficient time to answer the incoming calls before loading the VAPs.

If you with the Macintosh VAPs to load automatically at system boot time, see "How to automate loading the VAPs" on page 34.

MACSETUP prints a message that DTALK was not found

This indicates that you are running a previous version of MACSETUP. You need to install the latest MACSETUP version from the *MACINST* diskette. Insert the diskette in a DOS client's floppy drive A, type

```
A:MACINST
```

and press <Enter>. Then run the new version of MACSETUP by typing

```
MACSETUP
```

and pressing <Enter>.

System messages

This section lists some of the messages you might see at the console and describes the action you should take (if any) to correct the situation. These system messages are listed alphabetically.

`ABEND: Out of IPX sockets.`

This message is sometimes displayed if the VAPs are loaded on a very busy network without waiting to give the file server or bridge sufficient time to answer incoming calls before loading the VAPs. Please see "Macintosh VAPs are not loaded at system reboot" on page 147 for more information.

`ABEND: Out of IPX sockets on SPG NCP server half.`

You will see this message if the maximum number of concurrent logins is exceeded. NetWare v2.2 limits the number of user logins to 100. However, you must keep in mind that one login is required for each of the following: the AQSVAP, the APSVAP, and for each LAN adapter with Macintosh support. So, for example, if you have a server with three AppleTalk LAN interfaces, and you are running the AQSVAP and APSVAP, then the actual number of total connections available is 95, not 100.

You can limit the number of available Macintosh connections by using MACSETUP. Instructions for this are found on page 47.

`ABEND: VAP failed to login.`

This message is sometimes displayed if the VAPs are loaded on a very busy network without waiting to give the file server or bridge sufficient time to answer incoming calls before loading the VAPs. Please see "Macintosh VAPs are not loaded at system reboot" on page 147 for more information.

`AFP Gateway: bad format in ATFiles.CFG.`

This indicates that the ATFILES.CFG configuration file has been modified incorrectly or the file is corrupted. You should delete this hidden file from a DOS client and reconfigure Macintosh file services in MACSETUP. See "RECONFIG is used to change NetWare for Macintosh configuration information. You can use RECONFIG whenever you do the following:" on page 36 for information on ATFILES.CFG.

`AFP Gateway: configuration file ATFiles.CFG not found.`

ATFILES.CFG could not be accessed. You should check this hidden file from a DOS client and, if necessary, recreate it by reconfiguring Macintosh file services in MACSETUP.

`AFP Gateway: Not enough memory.`

There is insufficient memory in the file server to load this VAP. This can occur if the file server has a very large amount of disk space (for example, multiple Gbytes) or if the file server simply does not have enough RAM. To fix this problem, you can add more memory to the server. If the file server is very heavily loaded and adding memory does not correct this problem, run MACSETUP and reduce the number of maximum connections allowed through this AFP gateway. Each connection uses approximately 1K.

`AFP Gateway: too many servers in config file.`

ATFILES.CFG lists more than eight file servers for this gateway. Rerun MACSETUP and reduce the number of target file servers.

`AFPSPG: Could not register server named name.`

This message means that the file service VAP is trying to advertise a file server that is listed in ATFILES.CFG but cannot find the file server on the AppleTalk network. This can occur if you remove a LAN card from the VAP host and forget to run MACSETUP to delete servers that were configured on the non-existent LAN.

If you have not changed the VAP host configuration in any way and the named server is still up on the network, check all the network connections.

`APSVAP has an invalid number of processes.`

The file server was unable to allocate enough service processes. This can occur when the file server has heavy VAP or VAD demands; the file server is simply doing too much. You need to evaluate the service demands and reconfigure the file server to reduce the number of VAPs it needs to process. For example, you can install the NetWare for Macintosh VAPs on an external bridge and offload processing demands on the file server.

`APSVAP: An active queue has been deleted.`

An active queue is a queue that is being advertised on AppleTalk. This message means that the queue is no longer there. This can occur when someone deletes an AppleTalk print queue by using PCONSOLE instead of MACSETUP. You can reinstall the queue by running MACSETUP.

`APSVAP: An error occurred during font file write.`

This occurs when the QUERY command is trying to write a font file for an AppleTalk queue. Use VOLINFO to check that there is enough disk space and that directory entries are available on the SYS volume.

`APSVAP: APPLETALK Print Server object not found.`

The print server bindery object has been removed or corrupted. If you suspect that the bindery is corrupted, run BINDFIX. To set up print services again, run MACSETUP.

`APSVAP: Attempt to attach to a non-existent queue. The queue will be removed from the printer list.`

This message means that an AppleTalk queue is no longer there. This can occur when you use the ATTACH console command to attach a printer to the queue, or when the system boots up and the print VAP tries to connect with the queue. It usually means that someone has deleted the queue by using PCONSOLE or MACSETUP. You can reinstall the queue by running MACSETUP.

`APSVAP: Bad Server name specified APSVAP.`

This message is usually caused by specifying an invalid server name on a console command line. Otherwise, it can mean that a corrupted print job was submitted or a file server has gone down on the internet. Check the network and send the print job again.

`APSVAP: Connection lost during job file read/ file access /PostScript file read/PostScript File insert.`

This message means that the print server VAP was accessing a remote print queue and lost the connection to the remote file server. Check the network connections and the file server, and resend the print job.

`APSVAP: Console handler cannot log in to file server.`

The print server VAP could not make the proper connection with the file server. This can indicate that the bindery object is not present, or that the print services configuration is incorrect. If you suspect that the bindery is corrupted, run BINDFIX. Then run MACSETUP to check the proper configuration and if necessary, reconfigure print services.

`APSVAP: Could not create font file APSVAP.`

This occurs when the QUERY command is trying to create a font file for an AppleTalk queue. Use VOLINFO to check that there is enough disk space and that directory entries are available on the SYS volume.

`APSVAP: Either the maximum number of printers has been installed or a or an invalid printer name was entered.`

If you have configured more than five printers on this file server, reduce the number of printers and reconfigure. If you are not sure whether you entered an invalid printer name, connect a Macintosh to the printer and check its name in the Chooser. If the printer name is invalid, use the KILL command to remove the invalid printer from all associated queues, then use the ATTACH command or MACSETUP to attach to validly named printer.

`APSVAP: I/O Error on printer name.`

The print service VAP has not been able to maintain a good connection with the AppleTalk printer. Reset the printer, and check the network connections.

`APSVAP: Invalid file server specified or server is down.`

This occurs when you use a console command that attempts to connect to a remote file server, and that command does not find the file server on the network. Check both the network connections and the syntax of the console command.

`APSVAP: Invalid printer name specified.`

This occurs when you use a console command that attempts to connect to a printer, and it does not find the printer on the AppleTalk network. Check both the network connections and the syntax of the console command.

`APSVAP: Invalid Queue Name.`

This occurs when you use a console command that attempts to connect to a print queue, and it does not find the queue. Check the syntax of the console command.

`APSVAP: name Retrying... Printer name was not able to log in to file server.`

This occurs when the print service VAP is trying to access a queue on a remote file server and is unable to connect to the specified file server. Check the network connections to the remote server.

`APSVAP: No more printers can be added.`

Each instance of the print VAPs can handle a maximum of five printers and eight queues. This message occurs when you are trying to add printer when five printers are already installed. You can remove another printer to add this one, or install the VAPs on another print service gateway (a file server or bridge running the VAPs and print services) to handle additional printers.

`APSVAP: printer name is already servicing specified queue.`

An attempt was made to attach a printer to a queue, and that printer is already attached to the queue. Use the PLIST command to verify that the printer is attached to the specified queue.

`APSVAP: Printer name cannot attach to more than eight file servers.`

This message means that someone has configured remote queues on more than eight remote file servers. To fix this problem, remove one or more queues from the print service configuration on the VAP host. If you need to support queues on more than eight file servers, install the VAPs and configure print services on another file server or bridge.

`APSVAP: Printer name cannot service any more queues.`

This message means that the print VAPs have reached the maximum number of queues allowed (eight). To fix this problem, remove one or more queues from the print service configuration on the VAP host. If you need to support queues on more than eight file servers, install the VAPs and configure print services on another file server or bridge.

`APSVAP: Printer name cannot service untyped queue APSVAP.`

This usually means that a queue was created but not assigned a type. However, it can also mean that the ATPRINT.TYP file was not accessed properly or was corrupted. First, run MACSETUP to check the queue configuration, and assign a type to the queue if you have not done so already. If the queue already has an assigned type, reconfigure print services.

`APSVAP: Printer name Type does not match queue type.`

This usually means that the queue was assigned one printer type, and the actual printer attached to the queue is of a different type. If you are attaching a compatible printer, you can try ignoring this message and testing the connection by sending a print job. Otherwise, run MACSETUP to verify that the queue type matches the printer type.

```
APSVAP: Printer name was unable to attach to queue. (Queue will
        not allow new printers to attach.)
```

This can occur when you are using the ATTACH console command to attach a printer to a queue. It is possible that you specified a non-AppleTalk print queue on the command line, or that attaching to the queue has been disabled from PCONSOLE.

`APSVAP: queue limit exceeded APSVAP.`

This message means that the print VAPs have reached the maximum number of queues allowed (eight). To fix this problem, remove one or more queues from the print service configuration on the VAP host. If you need to support queues on more than eight file servers, install the VAPs and configure print services on another file server or bridge.

`APSVAP: Unable to attach to target server.`

The print service VAP attempted to connect to a file server and was unsuccessful. Check the network connection and reconfigure if needed.

`APSVAP: Unable to create/read/close Type file.`

The print service VAP was unable to access the ATPRINT.TYP file on the SYS volume of the VAP host correctly. Use VOLINFO to check that there is available disk space on the VAP host. If the

ATPRINT.TYP file is missing or if you suspect that it has been corrupted, recreate it by running MACSETUP and configuring print services again.

`APSVAP: Unable to read Setup File. Error # number.`

The print service VAP was unable to read the ATPRINT.SET file on the SYS volume of the VAP host correctly. Use VOLINFO to check that there is available disk space on the VAP host. If the ATPRINT.SET file is missing or if you suspect that it has been corrupted, recreate it by running MACSETUP and configuring print services again.

`APSVAP: Unable to service next job. Error # number.`

The print job in the queue cannot be printed due to problems with the queue or print job itself. Verify that the queue management system is working properly and reconfigure print services if necessary.

`APSVAP: Unable to update Setup File.`

The print service VAP was unable to write to the ATPRINT.SET configuration file on the SYS volume of the VAP host correctly. Check to make sure that there is available disk space on the VAP host. If the ATPRINT.SET file is missing or if you suspect that it has been corrupted, recreate it by running MACSETUP and configuring print services again.

`APSVAP: WARNING! Unable to verify printer type.`

The print service VAP was unable to determine from the ATPRINT.TYP configuration file the correct type of printer attached to the queue. Rerun MACSETUP to create this queue again and assign it a type.

`APSVAP: Invalid command No matching quote in command line.`

This can occur when you use a console command and forget to close double-quotes that enclose a printer name or zone and printer name that includes a space. Type the command again, checking the syntax.

`APSVAP: Printer name is not currently on-line.`

The AppleTalk printer did not respond. Power on or reset the printer and resend the print job. If you see this message a second time, use the PLIST command to verify that the printer is attached to the queue and if necessary, reconfigure print services.

`APSVAP: QUERY command cannot be executed at this time.`

The print service VAP is in a mode where it is unable to execute the QUERY command. Retry the QUERY command later.

`APSVAP: QUERY command cannot be executed while a print job is running.`

The print service VAP is in a mode where it is unable to execute the QUERY command. Retry the QUERY command later.

`APSVAP: Unable to attach to target server.`

The print service VAP was not able to connect with a remote file server. This can mean that the file server is not up on the internet or that the configuration is invalid or corrupted. Check network connections and, if necessary, reconfigure print services.

`AQS Error: APPLETALK Print Server object not found.`

The print server bindery object was not found. This can mean that print services on the VAP host were not configured properly or that the bindery of that server is corrupted or has been rebuilt. If you suspect that the bindery has been corrupted, run BINDFIX, then reconfigure by running MACSETUP.

`AQSVAP has an invalid number of processes.`

The file server was unable to allocate enough service processes. This can occur when the file server has heavy VAP or VAD demands; the file server is simply doing too much. You need to evaluate the service demands and reconfigure the file server to reduce the number of VAPs it needs to process. For example, you can install the NetWare for Macintosh VAPs on an external bridge and offload processing demands on the file server.

`AQSVAP: A File error occurred.`

A configuration file could not be accessed properly. You can recreate the configuration file by using MACSETUP to create queues again.

`AQSVAP: An active queue was deleted.`

An active queue is a queue that is being advertised on AppleTalk. This message means that the queue is no longer there. This can occur when someone deletes an AppleTalk print queue by using PCONSOLE instead of MACSETUP. You can reinstall the queue by running MACSETUP.

`AQSVAP: AQSVAP has an invalid number of processes.`

The file server was unable to allocate enough service processes. This can occur when the file server has heavy VAP or VADD (Value-Added Disk Driver) demands; the file server is simply doing too much. You need to evaluate the service demands and reconfigure the file server to reduce the number of VAPs it needs to process. For example, you can install the NetWare for Macintosh VAPs on an external bridge and offload processing demands on the file server.

`AQSVAP: Cannot find print services resource directory.`

The print service VAPs create two directories below SYSTEM on the SYS volume of the VAP host. These directories are named for the queue ID and the printer server bindery object ID. This message means that the VAP tried to access one of these directories and could not find it. It usually means that the configuration has changed (so the IDs no longer match the directory names), or the directories have been deleted. To fix this problem, recreate the configuration by using MACSETUP.

`AQSVAP: Console processor busy. Please try again.`

This can occur when you have typed a console command and the VAP cannot service it at this time. Retry the command later.

`AQSVAP: Error creating Type file path.`

This can occur when you load the VAPs for the first time or when you attach a printer by using the ATTACH command. It indicates a typical I/O problem and usually means that there is insufficient disk space on the file server. Use VOLINFO to check that there is enough disk space and directory entries are available on the SYS volume.

If this message occurs while you are attaching a printer, you might see a message indicating that the queue is assuming the default

printer type of LaserWriter II NT. This can occur when the printer you are attaching is not an Apple printer.

`AQSVAP: Error writing to LaserWriter queue.`

The print service VAP was not able to place a print job in the queue. Use VOLINFO to check that there is enough disk space and directory entries are available on the SYS volume. If there is no problem with disk space and directory entries, check that the queue configuration has not been modified.

`AQSVAP: Error writing to queue.`

The print service VAP was not able to place a print job in the queue. Use VOLINFO to check that there is enough disk space and that directory entries are available on the SYS volume. If there are no problems with disk space and directory entries, check that the queue configuration has not been modified.

`AQSVAP: Failed to write EOF.`

The print service VAP was not able to complete the process of placing a print job in the queue. In this case, you might see a zero-byte file in the print queue. Use VOLINFO to check that there is enough disk space and that directory entries are available on the SYS volume. If there are no problems with disk space and directory entries, check that the queue configuration has not been modified.

`AQSVAP: Invalid queue ID.`

This usually means that a queue has been modified or deleted. It indicates that the print service VAP is not configured correctly for this queue, and you need to reconfigure the queue to correct the situation.

`AQSVAP: Login failure AQSVAP.`

The file server did not allow the print VAP to log in, or else the bindery has been modified. This can mean that print services on the VAP host were not configured properly or that the bindery of that server is corrupted or has been rebuilt. If you suspect that the bindery has been corrupted, run BINDFIX, and then reconfigure by running MACSETUP.

Another reason for login failure can be if the VAPs are loaded on a very busy network without waiting to give the file server or bridge

sufficient time to answer incoming calls before loading the VAPs. Please see "Macintosh VAPs are not loaded at system reboot" on page 147 for more information.

`AQSVAP: Maximum queue limit exceeded.`

Each instance of the print VAPs can handle a maximum of five printers and eight queues. This message means that the printer has reached the maximum number of queues allowed. To fix this problem, remove one or more queues, or install the VAPs and configure print services on another file server or bridge to extend the number of remote queues allowed.

`AQSVAP: No more logins allowed.`

The file server will not allow the print VAPs to log in because there are no more connections available. This can occur on the VAP host if you wait several minutes before loading the VAPs at system boot time, but it is more likely to occur when the VAPs are attempting to log into a target server. This message indicates a very heavily utilized file server; to allow the print VAPs to log in you need to release some of the connections by asking people to log off the file server. In the long term, you should consider reconfiguring to process the queue on another file server.

`AQSVAP: No more PAP connections.`

This means that the print service VAP failed to allocate a proper Printer Access Protocol (PAP) session with the Macintosh sending a print job. It indicates a problem on the AppleTalk network; for example, the cable might be functioning improperly, or there might be too many AppleTalk nodes on that network for efficient operation.

`AQSVAP: PAP GetNextJob failed.`

The VAP failed to complete a full Printer Access Protocol (PAP) session with the Macintosh sending a print job. It indicates a problem on the AppleTalk network; for example, the cable might be functioning improperly, or there might be too many AppleTalk nodes on that network for efficient operation.

`AQSVAP: PAP not initialized.`

The VAP failed to initialize a proper Printer Access Protocol (PAP) session with the Macintosh sending a print job. It indicates a problem on the AppleTalk network; for example, the cable might be functioning improperly, or there might be too many AppleTalk nodes on that network for efficient operation.

`AQSVAP: Server attachment failure.`

The file server did not allow the print VAP to log in, or else the bindery has been modified. Reconfigure the gateway, and rebuild the bindery if necessary.

`AQSVAP: unable to create/open/close/read/write settings file.`

The print service VAP was unable to access the ATPRINT.SET file on the SYS volume of the VAP host correctly. Use VOLINFO to check that there is available disk space on the VAP host. If the ATPRINT.SET file is missing or if you suspect that it has been corrupted, recreate it by running MACSETUP and configuring print services again.

`AQSVAP: Unable to init queue.`

The print service VAP was unable to initialize the print queue on the server correctly. Use PCONSOLE to perform a few operations on the queue (such as adding a different printer or adding a valid queue user) to check that the queue has not been damaged. If necessary, use MACSETUP to recreate the queue.

`AQSVAP: Unable to read status for queue. Error #.`

The print service gateway was unable to receive the status of a print queue correctly. Use PCONSOLE to perform a few operations on the queue (such as adding a different printer or adding a valid queue user) to check that the queue has not been damaged. If necessary, use MACSETUP to recreate the queue.

`AQSVAP: Print Server name was unable to print ban`
`ner...Trying again.`

For non-AppleTalk print jobs the print service gateway prints a banner page. The banner page configuration file might have become lost or corrupted. Rerun MACSETUP.

`AQSVAP: Selected queue has not been typed.`

This queue does not have a printer type associated with it. This can occur when configuration information has become lost or corrupted, or when a type was simply not assigned when it was created in MACSETUP. Use MACSETUP to recreate the queue and assign it a type.

`ATALK: Protocol installation aborted.`

The initialization between the AppleTalk driver and the ATALK VAP was not successful. Check that the NetWare operating system was successfully generated with the correct drivers, and then use MACSETUP to reinstall the AppleTalk software. After you load the VAPs at system reboot, use the VAP console command to verify that the proper AppleTalk transport VAPs were loaded.

`ATALK2: Driver not found.`

The VAP has not found a valid AppleTalk Phase 2 driver linked into the file server or bridge operating system. Check that the NetWare operating system was successfully generated with the correct drivers, and then use MACSETUP to reinstall the AppleTalk software. After you load the VAPs at system reboot, use the VAP console command to verify that the proper AppleTalk transport VAPs were loaded.

`ATALK2: Protocol installation aborted.`

The initialization between the AppleTalk driver and the ATALK2 VAP was not successful. Check that the NetWare operating system was successfully generated with the correct drivers, and then use MACSETUP to reinstall the AppleTalk software. After you load the VAPs at system reboot, use the VAP console command to verify that the proper AppleTalk transport VAPs were loaded.

`ATALK2: Router configuration error, Network number not in cable range.`

This message means that the AppleTalk Phase 2 network number assigned to the file server or bridge is not within the network range configured on an AppleTalk router on that LAN. Check the router configuration and select a valid number from its network range. Then use MACSETUP to assign that number to the NetWare VAP host.

Appendix A. Configuration concepts

This Appendix presents the AFP and print service concepts used in configuring NetWare for Macintosh. If the network at your site includes more than one AppleTalk network or more than one NetWare file server, these concepts will help you to configure NetWare for Macintosh most effectively.

A key concept to understand is that NetWare for Macintosh *does not* include AppleTalk routing. Instead, it uses gateways that translate AFP and Macintosh print requests to NetWare and then translate the results (of the file or printer access) back to AFP and AppleTalk.

This means that when NetWare for Macintosh is configured correctly, Macintosh clients can access NetWare services on file servers connected to a different LAN, or across a NetWare router. However, it also means that the same Macintosh clients will not have access to AppleShare file servers or network modems (devices that understand AppleTalk and not NetWare) which are connected to a different cable. This type of AppleTalk interconnectivity can be provided only by third-party AppleTalk routers.

Note: NetWare v3.0 and above does provide AppleTalk routing, allowing Macintosh clients to access AppleTalk devices (file servers and network modems, for instance) across LANs.

NetWare file and print services

A NetWare for Macintosh **VAP host** is a file server or router that runs the VAPs. The VAPs contain service protocol gateways that translate between AppleTalk and NetWare. These gateways are the only point on a network where NetWare and AppleTalk interoperate.

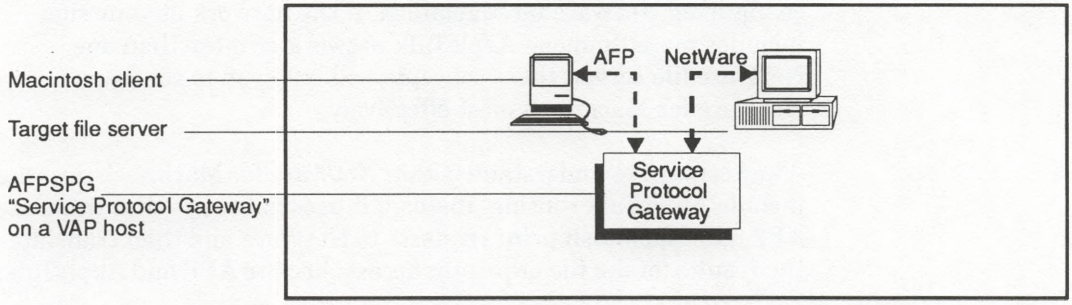


FIGURE A-1 AFPSPG: Service Protocol Gateway

Each VAP host can be configured with up to eight target file servers and up to eight remote print queues. When a file server is a **target**, it means that a Macintosh can access files on that server by logging in through the Macintosh Chooser. Similarly, when an AppleTalk print queue is configured on a target file server, it means that a Macintosh can access that queue by selecting it in the Macintosh Chooser.

Target file servers are not necessarily VAP hosts, and *vice versa*. After the protocol gateways have translated AppleTalk data packets to NetWare data packets, the file or print requests can be directed to volumes on the VAP host (that is, when the VAP host is configured as a target file server) or routed on the NetWare internet to other target file servers.

AppleTalk services and zones

An AppleTalk zone is a logical grouping of devices that makes it easier for users to locate and access network services in the Chooser. A zone can be defined only in AppleTalk router

configurations. It is *not* defined by a physical grouping of devices on a cable. It there are no AppleTalk routers on a network, a single default zone is created implicitly and all nodes are placed in that zone.

An AppleTalk zone limits the range of broadcast traffic (or multicast traffic in Phase 2) on a network. This is why users must select the proper zone in the Macintosh Chooser before seeing a service advertised in that zone. If all devices are in the same default zone, that unnamed zone is chosen by default when a user opens the Chooser.

The VAP host broadcasts (or "advertises") all of its configured target servers and remote print queues in its own AppleTalk zone. This allows Macintosh users to log into target file servers and access remote AppleTalk print queues through the Chooser, even though the file servers supporting these services are not actually running the VAPs, and are therefore not actually AppleTalk nodes. All traffic between the targets and the Macintosh clients is processed by the gateways on the VAP host.

The fact that all target file servers and remote print queues are advertised in the same AppleTalk zone as the VAP host can cause an AppleTalk naming conflict if you configure multiple VAP hosts incorrectly. This is explained and correct solutions are shown in the next section.

Configuring VAP hosts and target file servers

When you are planning your network configuration, there are two important ideas to keep in mind:

- ***Plan some redundancy into the topology.*** When you are deciding which NetWare file servers or routers should run the NetWare for Macintosh VAPs, you might want to configure more than one VAP host to service requests to your target file servers. In that way, your configuration has built-in redundancy in case a VAP host fails.
- ***Avoid bottlenecks by distributing the VAPs.*** It is important to calculate the maximum number of users that could be using the target file servers concurrently. Because all service requests are processed by the VAP host before they are forwarded to the

remote target, a single VAP host can be very heavily loaded when many Macintosh users are accessing its targets at the same time. You might want to distribute the VAPs on several hosts to avoid creating a performance bottleneck on a single VAP host.

Problem: AppleTalk naming conflict

A naming conflict can occur if you install NetWare for Macintosh on more than one file server or router on the same cable, and them configure each VAP host with multiple target file servers, naming the VAP hosts as targets of each other.

For example, FIGURE A-2 shows a configuration with two NetWare v2.2 file servers on a backbone network with LocalTalk LANs for Macintosh workstations.

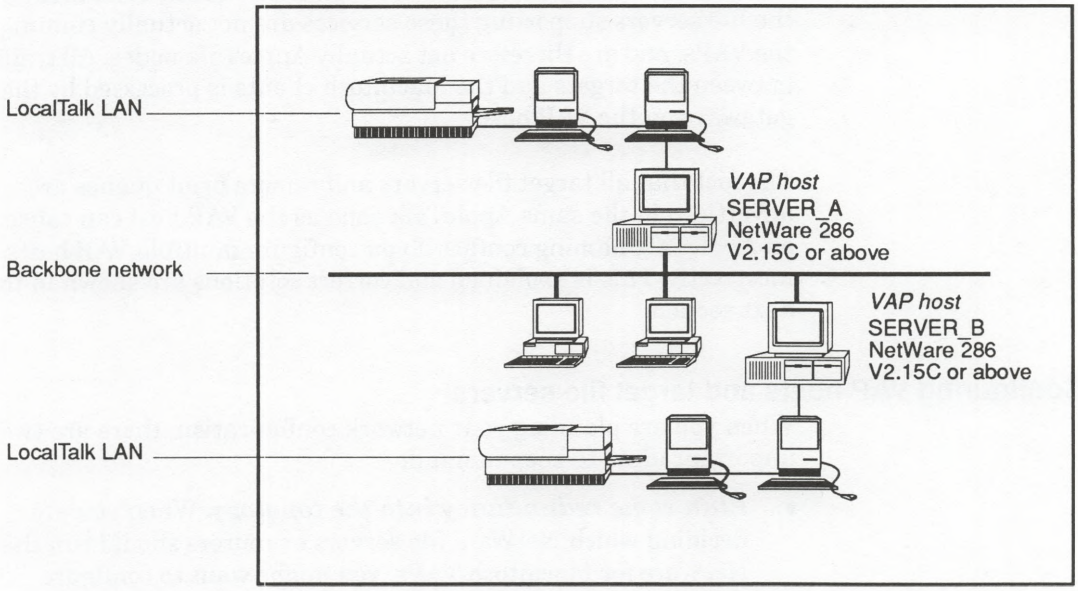


FIGURE A-2 Possible naming conflicts within a zone

In this case, you wish to allow Macintosh users on both LocalTalk networks to access each other's services. If you install the VAPs only on SERVER_A, the Macintosh workstations on SERVER_B's LocalTalk network will be unable to access any NetWare file servers, including SERVER_B.

However, if you install NetWare for Macintosh on both SERVER_A and SERVER_B, and both servers are in the same AppleTalk zone (for example, if there are no AppleTalk routers on the backbone), you are likely to create an AppleTalk naming conflict.

Such a conflict will occur if you install the VAPs on SERVER_A and configure SERVER_B as a target, and install the VAPs on SERVER_B and configure SERVER_A as a target. This is shown in FIGURE A-3.

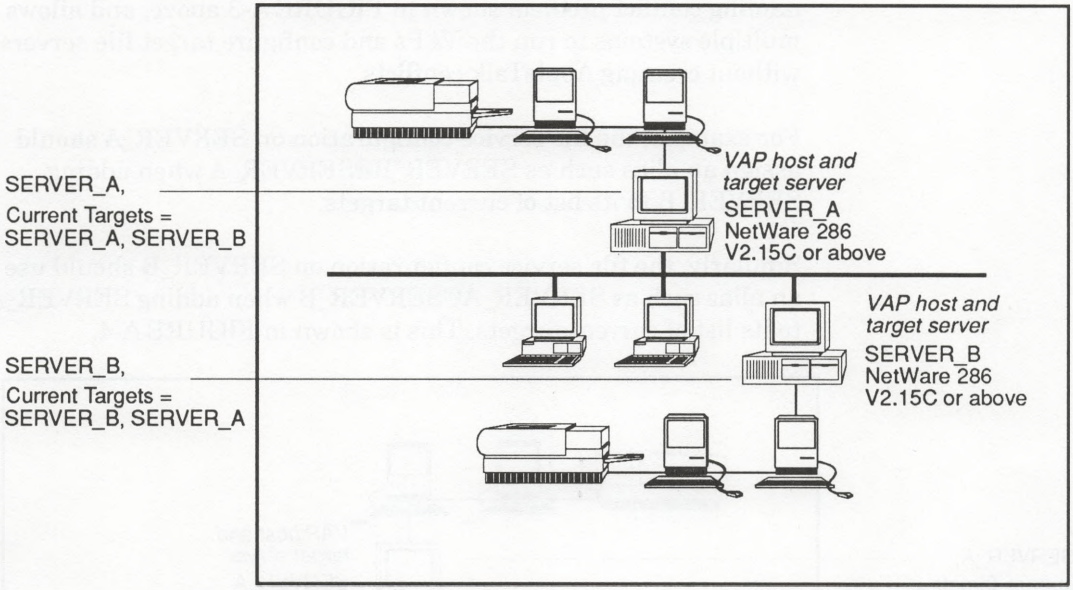


FIGURE A-3 Incorrect use of targets and hosts

In this case, Macintosh users on each LocalTalk network will be able to access their local file server and its targets, because they are receiving broadcasts only from the local server.

However, on the backbone network, where both file servers are connected to the same network, Macintosh workstations will receive broadcasts from each file server at two different node addresses. In this case, AppleTalk cannot resolve the conflict, and the file server names will disappear and reappear rapidly in the

Macintosh Chooser. A solution to this problem is discussed in the next section.

Solution: use aliases

To resolve the AppleTalk naming conflict described above, you can assign an alias to the remote targets configured on both SERVER_A and SERVER_B. An **alias** is an AppleShare-style name for a target server, which is used instead of the file server's NetWare name when broadcasting on the AppleTalk network. This avoids the naming conflict problem shown in FIGURE A-3 above, and allows multiple systems to run the VAPs and configure target file servers without creating AppleTalk conflicts.

For example, the file service configuration on SERVER_A should assign an alias such as SERVER_B@SERVER_A when adding SERVER_B to its list of current targets.

Similarly, the file service configuration on SERVER_B should use an alias such as SERVER_A@SERVER_B when adding SERVER_A to its list of current targets. This is shown in FIGURE A-4.

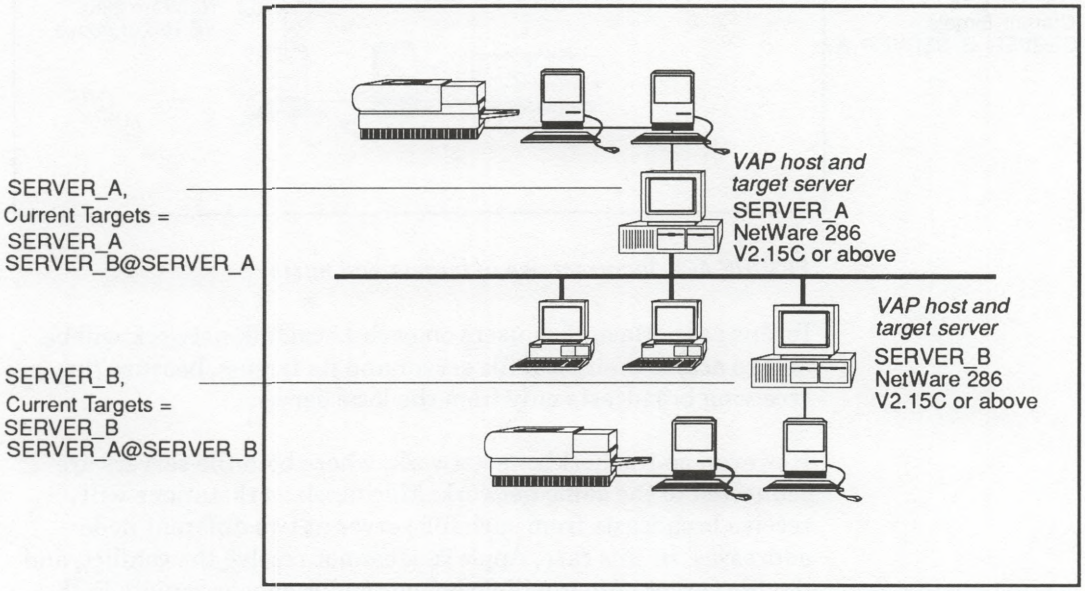


FIGURE A-4 Correct use of targets with aliases

In this case, Macintosh users on both LocalTalk networks will be able to access file services on both file servers. For the Macintosh users on the LocalTalk LAN connected to SERVER_A, the Macintosh Chooser will contain two entries:

SERVER_A

SERVER_B@SERVER_A

For the Macintosh users on the LocalTalk LAN connected to SERVER_B, the Macintosh Chooser will also contain two entries:

SERVER_B

SERVER_A@SERVER_B

The Macintosh on the backbone network would see all four entries in the Chooser:

SERVER_A

SERVER_B

SERVER_B@SERVER_A

SERVER_A@SERVER_B

Changing zones in a VAP host: AppleTalk Phase 2

If the backbone network supporting both file servers has AppleTalk Phase 2 routers with a configured zone list, you can decide to place SERVER_A and SERVER_B in separate zones instead of assigning aliases. Please see "About RECONFIG" on page 37 for details about selecting a new zone for the VAP host.

Remote print queues on target servers

The NetWare for Macintosh VAP host publishes (advertises) AppleTalk print queues as LaserWriters or ImageWriters in its own zone. Because a LaserWriter or ImageWriter is a device with a discrete node address, you must also be careful about publishing AppleTalk queues from multiple NetWare file servers or routers.

Note: The print service VAPs do not have an alias mechanism such as the one described above for Macintosh file services. You must therefore be careful to avoid publishing a queue from two file servers in the same zone.

For example, if you have configured SERVER_A to process an AppleTalk queue named "Igneous_queue," that queue will be published from SERVER_A by default. If you wish to publish the queue from another file server (SERVER_B) follow these steps:

1. **At the console for SERVER_A, type**

   ```
   UNPUBLISH Igneous_queue
   ```

   and press <Enter>. This stops SERVER_A from advertising the queue on the AppleTalk network.

2. **At the console for SERVER_B, type**

   ```
   PUBLISH SERVER_A/Igneous_queue
   ```

   and press <Enter>. The queue will now be published from SERVER_B instead. If you neglect to UNPUBLISH the queue from SERVER_A first, you will see evidence of an AppleTalk naming conflict (that is, the queue name will appear and disappear rapidly in the Macintosh Chooser).

Using multiple AppleTalk LANs in a file server

You can configure up to four AppleTalk LANs in a NetWare v2.2 file server running the NetWare for Macintosh VAPs. If each of these LANs supports additional NetWare file servers, and you configure target file servers correctly, you can provide a wide range of NetWare services to Macintosh clients on all four LANs.

For example, FIGURE A-5 shows a NetWare v2.2 file server with four AppleTalk LANs, and a total of six NetWare file servers (including the VAP host) that are configured as target file servers in the VAP host configuration. These servers will be accessible to Macintosh clients on all four LANs. Similarly, a queue is configured

on SERVER-2 to print on the LaserWriter connected to SERVER-2, and this queue is accessible to Macintosh clients on all four LANs.

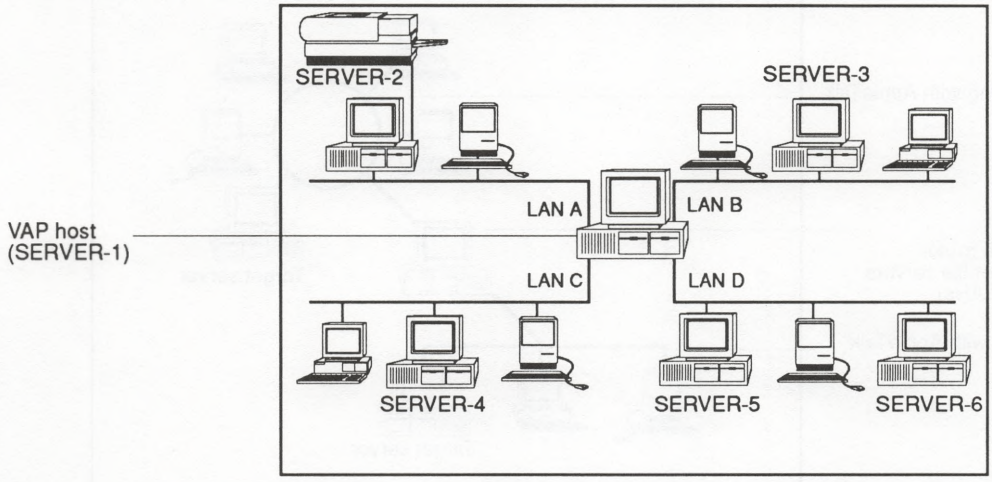


FIGURE A-5 A file server with multiple LANs and targets

Using multiple AppleTalk LANs in a router

If you use a NetWare router as the Macintosh VAP host, you can offload VAP processing overhead from file servers, allowing faster disk access on those servers, and provide a wider range of NetWare file and print services to Macintosh users.

The router can be configured with target file servers on both router interfaces (as shown in FIGURE A-6), allowing the Macintosh clients to access file servers across the router on each other's networks. Only the router needs AppleTalk LAN drivers and

NetWare for Macintosh; the file servers on both LANs can be running pure NetWare v2.2 or NetWare v3.0 or above.

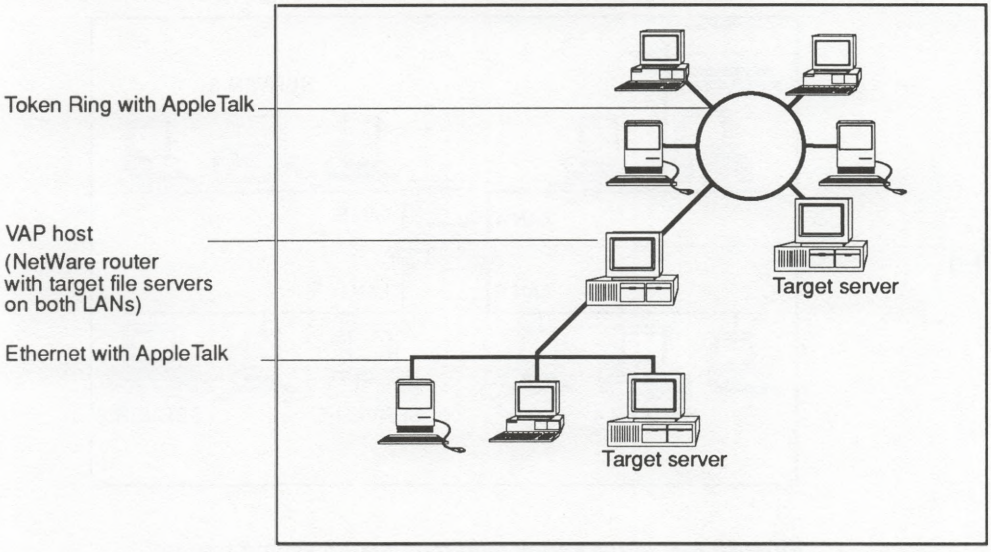


FIGURE A-6 NetWare router as VAP host with targets on both LANs

In this case, Macintosh users on the Token Ring network will be able to log into the target file server and access print queues on their own LAN as well as the Ethernet LAN across the router. The same is true for the Macintosh user on Ethernet who can log into the file servers and access AppleTalk print queues on both networks.

Glossary

access privileges AppleShare uses this term to mean the privileges to open and make changes to folders and their contents. NetWare uses the term "rights" in its data security scheme. See rights.

address A unique destination for data sent across a network.

administrator The person who sets up a file server, creates user login accounts and their passwords, creates groups, sets security and maintains the server.

AppleTalk The term AppleTalk is used to describe a suite of protocols, defined in *Inside AppleTalk* (Addison-Wesley Publishing Company, Inc.) This book is available in book stores, from Apple Computer, and from the publisher. It provides the complete AppleTalk network specification.

AppleTalk router Hardware, firmware, or software that routes packets between AppleTalk networks. An AppleTalk router joins separate networks into an internet, where devices on one cable can transparently access devices on another cable.

AFP (AppleTalk Filing Protocol) A protocol used to provide access between file servers and clients in an AppleShare network.

bindery The NetWare bindery is a database that contains definitions for entities such as users and groups, file servers, print servers, or any other entity that has been given a name. Each bindery object has associated properties, such as passwords, account restrictions, internet addresses, and so forth.

Chooser A desk accessory that lets you "choose" devices such as file servers and printers on the AppleTalk network system. You can also specify a user name that the system uses from time to time—when you're printing on a LaserWriter, for example.

client A computer that has access to services on a network. The computers that provide services are called servers. A user at a client may

request file access, remote log-on, file transfer, printing, or other available services from servers.

desk accessory A "mini-application" that is available from the Apple menu regardless of which application you're using—for example, the Macintosh Calculator, Scrapbook, Key Caps, and Chooser. NetWare provides a desk accessory for users to set security, view print queues, and send messages. Desk accessories are installed by using the Font/DA Mover.

external router An external router runds in a networked computer that is not a file server. It manages packet routing with its ROUTER.EXE file.

file server A combination of controller software and a mass-storage device that allows computer users to share common files and applications through a network. A file server on an AppleTalk network may be a Macintosh computer running AppleShare software or an 80286 or 80386-based system running NetWare for Macintosh software.

Finder The application that maintains the Macintosh desktop and starts up other programs at the request of the user. You use the Finder to manage documents and applications, and to get information to and from disks. You see the desktop upon starting up your computer, unless you have specified a different startup application.

folder A holder of documents, applications, and even other folders on the desktop. Folders act as subdirectories, allowing you to organize information in any way you want. A folder is the secondary organizing unit on the file server.

gateway A connection between two or more networks, especially those using different protocols. Gateway functionality usually includes translation or encapsulation of data for transmission on different media. NetWare for Macintosh includes two software gateways, one in the file services VAP and one in the queue service VAP.

group A named collection of one or more file server users. Groups are created for users who usually have common interests and share information.

guest A user who is logged on to a server without a registered user name and password. A guest cannot own a private folder.

host A NetWare file server or a router that is actually running the NetWare for Macintosh VAPs. Compare with target.

internet Any interconnected group of networks; for example, an interconnected group of AppleTalk network systems. Network users in an internet can share information and network devices.

LaserWriter Namer An application on the *LaserWriter Installation Disk* that you use to name and rename LaserWriter printers.

LocalTalk A system of cables, cable extenders, and connector boxes that connect computers and network devices as part of the AppleTalk network system. LocalTalk kits are manufactured by Apple Computer. Generally, where this manual refers to a LocalTalk connection, you can use any system of cable and connectors that supports AppleTalk protocols at 230.4 kbits/second to interconnect Macintosh computers and other AppleTalk devices.

MultiFinder A first-generation multi-tasking operating system for Macintosh computers that makes it possible to have several applications open at the same time, including background applications that let you perform one task while the computer performs another.

multilaunch An application stored on a server that several users can open and use at the same time.

network A collection of interconnected, individually controlled computers, together with the hardware and software used to connect them. A network allows users to share data and peripheral devices such as printers and storage media, to exchange electronic mail, and so on.

network administration Management of the software and hardware that connects computers in a network. This includes such functions as assigning addresses to hosts, maintaining network data files across the network, and setting up internetwork routing. This can also include "local" tasks on a file server; for example, starting up and shutting down the system, adding and removing user accounts, and backing up and restoring data.

node On a network, a point where a device is connected; often used to refer to the device itself. Some examples of AppleTalk nodes are Macintosh computers, LaserWriter or Imagewriter printers, and NetWare file servers.

owner AppleShare uses the concept of ownership (a user who creates a folder or who is assigned ownership) in controlling data security. NetWare does not use the concept of ownership to control access to data; instead, users may be assigned as trustees of a folder and assigned access control or parental rights.

password A unique word or set of characters that must be entered before a registered user at a workstation can access a volume on a server. NetWare for Macintosh limits a password to eight characters.

printer port A socket on the back panel of a Macintosh marked by a printer icon. In addition to being a connection for a printer, a printer port also serves as the usual attachment point for an LocalTalk connector on Macintosh computers.

print queue A collection of spooled documents, awaiting printing, stored on the print server disk and printed in order.

protocol A set of rules for communicating data within a network or internet. The protocol specifies the format, timing, and sequence in which information is transmitted. Common protocols include ALAP, RTMP, NCP, and IPX.

rights The rights to access and make changes to data on a NetWare file server. There are eight separate NetWare rights, and these may be granted or withheld from users in several ways.

router A combination of hardware and software that connects two or more networks in an internet. Routers are used to increase the number of devices and the distances covered in a network. A NetWare router also keeps track of the most efficient path to networks that are not directly connected to the router.

short name A valid MS-DOS (or PC-DOS) file name that a server creates for every Macintosh volume name, folder name, or file name on the NetWare file server.

SPG (Service Protocol Gateway) A software gateway included in the NetWare for Macintosh AFPSPG VAP. This gateway translates AFP requests received from the Macintosh into NCP requests understood by NetWare, and vice versa. When the translation has been performed, these requests can be routed normally to other file severs on the NetWare internet.

spool To send documents to the print server disk to be stored until they are printed. The word's origin is SPOOL, which stands for simultaneous peripheral operations on line.

startup disk A disk with all the necessary program files—such as the Finder and System files contained in the System Folder for the Macintosh—to set the computer into operation. Sometimes called a boot disk.

target NetWare file servers that provide services to Macintosh users. A target file server can provide Macintosh file service without running the NetWare for Macintosh software.

VAP (Value-Added Process) NetWare 286-specific software that can be loaded at system boot time to provided added functionality to the NetWare operating system. NetWare for Macintosh includes several VAPs.

VAP host A NetWare 286 V2.15C file server or router running the NetWare for Macintosh VAPs. A VAP host can be configured with up to eight target file servers. A VAP host can be a target file server, or it can simply process the VAP translations and forward file and print access requests to remote target file servers.

volume A general term referring to a storage device or to part of a storage medium formatted to contain files; a source of or a destination for information. A volume can be an entire disk or only part of a disk. A volume has a name and a volume directory with the same name. Its information is organized into files.

workstation A node through which a user can access a server or other nodes.

zone In AppleTalk Phase 1, a zone is a named logical grouping of one or more networks in a series of interconnected networks, joined through routers. In AppleTalk Phase 2, the same definition applies, except that multiple networks can exist on a single high-speed cable such as Ethernet or Token Ring; therefore a list of zone names can be applied to a single cable.

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